SONY®

SERVICE MANUAL

CV-2100ACE

VIDEO TAPE RECORDER

SONY CORPORATION

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Model CV-2100ACE

VIDEO TAPE RECORDER

SONY CORPORATION
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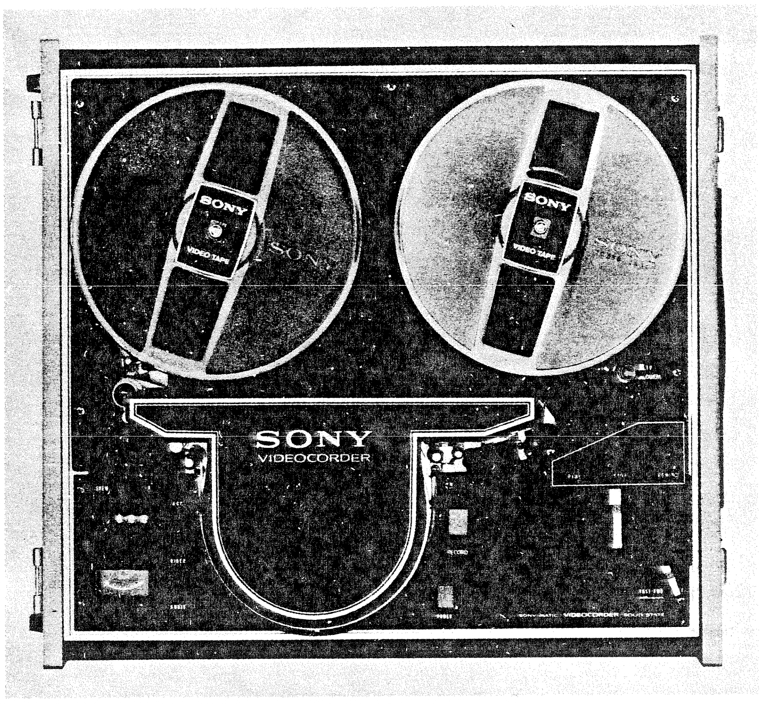

SONY
VIDEO TAPE
SONY
VIDEOCORDER

SONY VIDEO TAPE RECODER

MODEL CV-2100ACE

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SECTION 1

GENERAL DESCRIPTION

1-1. INTRODUCTION

This manual provides service information for the Videocorder deck Model: CV-2100ACE. Camera and Monitor service information is found in separate Service Manuals.

1-2. SPECIFICATIONS

Video recording system:	Rotary two-heads slant-track scanning, electromagnetic servo control.
Recording signal:	Composite video signal based on CCIR TV systems (standard or industrial sync): British TV standard (405-line) CCIR Western European, Belgian, Italian, Irish and OIRT TV standard (625-line) French TV standard (819-line)
Recording time:	40 minutes (continuous) using V-32 video tape (2370ft/720m) 20 minutes (continuous) using V-31 video tape (1240ft/380m)
Tape speed:	11½ inches (29.14cm) per second.
Tape width:	1/2 inch (12.7mm)
Reel size:	Max. 7 inch.
Wow and flutter:	Less than 0.18%.
Tape rewind time:	Within 7 minutes (V-32 video tape)
Video modulation system:	Frequency modulation
Horizontal resolution:	Better than 240 lines (at 625-line)
Video signal-to-noise ratio:	Better than 40 dB.
TV connector:	Video input: Composite video, 1 to 3 volts (p-p), 75 ohms, unbalanced, sync negative. Video output: Composite video, 1.4 volts (p-p), 75 ohms, unbalanced, sync negative. Audio input: -20 dB (78 millivolts), high impedance, unbalanced. Audio output: 0 dB (0.775 volts), high impedance, unbalanced.
Video camera input: (6P connector)	For SONY Video Camera Kit VCK-2000ACE and VCK-2100ACE.
Video input:	1 to 3 volts (p-p), 75 ohms unbalanced, Sync negative.
Video output:	1.4 volts (p-p), 75 ohms unbalanced, Sync negative.
Microphone input:	-65 dB (0.42 millivolt), 250 - 600 ohms, unbalanced.
Audio auxiliary input:	-20 dB (78 millivolts), high impedance, unbalanced.
Audio line output:	0 dB (0.775 volts),10K ohms, unbalanced.
Audio frequency range:	80 - 10,000 Hz.
Audio signal-to-noise ratio:	Better than 40 dB.
Distortion: (at 1 KHz)	Within 5% at rated line output.
Head:	Audio/Servo control head impedance: audio: 1K ohms at 1 KHz servo control: 1K ohms at 1 KHz

Erase head impedance: 500 ohms at 50 KHz

Motor: Hysteresis, single phase, HC-024.

Semi-conductors:

Semi-conductors:	Transistors	62
	Diodes	34
	Thermistors	2

Video camera: Any kind of 50 field video camera can be connected. All SONY 50 field video cameras with model numbers in the 2,000 series are recommendable.

Video monitor: SONY video monitor

CVM-306UMP for French, Belgian and CCIR Western European TV standard.

CVM-51UETP for CCIR Western European and Italian TV standard.

CVM-306UBP for British TV standard.

Power requirements: AC 240V, 220V, 110V, 100V ±10%. CV-2100ACE comes in two types, with preset voltage of 240V or 220V.

50 Hz ± 0.5 Hz

Power consumption: 110W at zero signal

AC outlet for camera: AC 100V

Dimensions: 18-1/8 (W) x 11 (H) x 15-3/4 (D)" (460 x 280 x 400mm)

Weight: 55 lbs. (25 kgs)

1-3. CONTROLS AND INDICATORS

A. POWER SWITCH BUTTON
When depressed, it connects the AC power line to the power transformer primary circuits of the Videocorder.

B. RECORD BUTTON
When depressed, it connects the AC power to the motor of the Videocorder from the power transformer. TV or Camera video signals pass through the entire video system and appear at the video output terminals. Thus, the monitor displays signals that have been processed by the electronic systems of the Videocorder. Similarly, input audio signals are processed by the audio circuits and are fed to the monitor. This mode of operation, where by the monitor displays pictures and sound that are fed to the input circuits of the Videocorder for recording purposes, is called "E-to-E" operation. Actual recordings begin when the RECORD button is held down and the FUNCTION LEVER is set to the PLAY position. A cam-operated switch, controled by the FUNCTION LEVER, then applies power to the record (head-driver) amplifiers and the audio bias/erase oscillator.

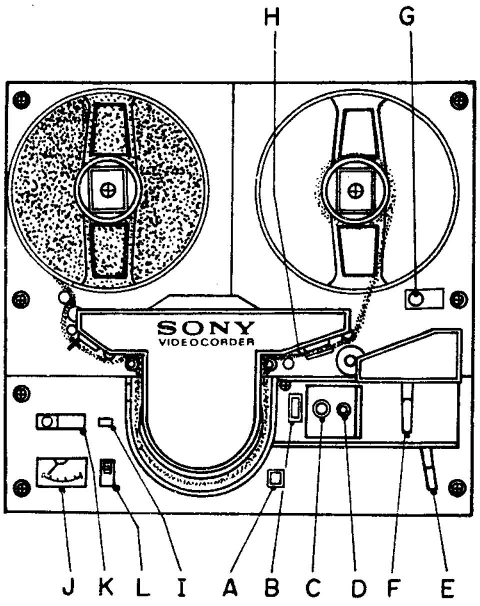


Fig. 1-1. Controls and indicators.

C. SOUND DUBBING BUTTON
EDITING button and then this button are depressed in order to add sound (audio signals) on a pre-recorded video tape. In this circumstance, video sections and servo sections operate in the playback mode, and audio sections operate in the record mode.

D. EDITING BUTTON
To edit the video tape. This button permits easy switch over from playback to a new camera/microphone recordings. It also permits sound dubbing during playback in conjunction with the SOUND DUBBING button.

E. FAST FORWARD LEVER
To advance the tape rapidly, keep the FUNCTION SELECTOR LEVER in the PLAY position and slide the fast forward lever to the left until a slight click is heard. When

the lever is actuated, drive is applied directly to the take-up reel and the Pinch Roller is pulled back from the Capstan.

F. FUNCTION SELECTOR LEVER

PLAY position . . . To record and playback
STOP position . . . . . .To stop tape motion
REWIND position . . . . To rewind the tape

Basic functions are as follows.

PLAY:	Cam switch supplies AC power to the motor. Pinch roller presses against capstan to feed tape. Take-up reel is driven through a friction-clutch. Cam-operated switch supplies power to the bias/erase oscillator and record amplifier through the RECORD switch.
STOP:	Supply and Take-up reels are braked. Pinch roller is released. Drive is disconnected from both reel tables.
REWIND:	Cam switch supplies AC power to the motor. Friction drive is applied to the supply reel. Pinch roller is released from the Capstan and braking is removed from the take-up reel.

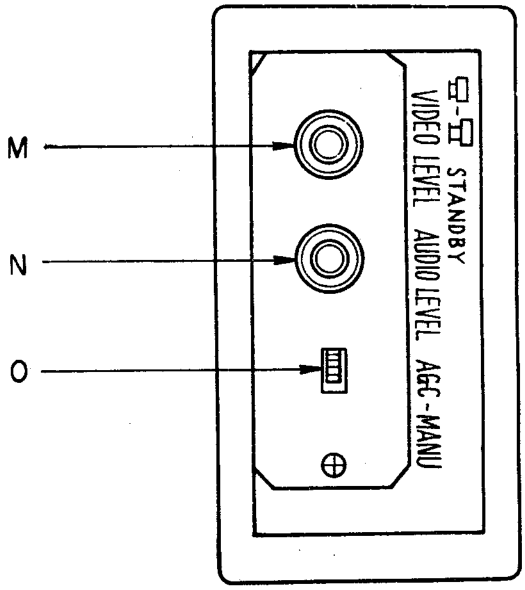


Fig. 1-2. Controls.

G. TV/CAMERA BUTTON

This switch has two positions, TV and Camera.

TV position:	To record off-the-air TV programs applied by the SONY TV monitor. Playback can be made independently regardless of setting of the Button.
Camera position:	To record pictures supplied by the Video camera and other Video input signals.

H. AUTOMATIC SHUT OFF SWITCH

This switch senses the presence of tape in the normal tape path, and shuts off the AC input power for the motor if tape runs out or breaks when the Function Lever is in the PLAY or REWIND position. This automatic feature is disabled when the Function Lever is in the STOP position.

I. AGC LIGHT

AGC lamp lights only in record mode when AGC/MANU switch is in the AGC position. Audio and Video recording levels are adjusted automatically when light is on.

J. TAPE COUNTER AND RESET BUTTON

Indicates the amount of the tape used in either record or playback. The readout serves as a reference to locate selected recordings on the tape. Before recording, press the RESET BUTTON to set tape counter to (000).

K. LEVEL METER

Level meter indicates either video or audio recording level (depending upon the setting of the LEVEL METER SELECTOR) during manual recording. Also in playback mode the meter indicates Video or Audio signal level. If the AGC/MANU selector is switched to AGC position, the meter will not work.

L. LEVEL METER SELECTOR

determines the Level Meter Function.

VIDEO.	To check the recording or playback video level during MANUAL mode of operation. While recording, adjust the VIDEO LEVEL CONTROL / STANDBY KNOB to obtain a reading in the blue zone of the LEVEL METER.
AUDIO.	To check the recording or playback audio level during manual

mode of operation. While recording, adjust the AUDIO LEVEL CONTROL to obtain a reading that the needle of the LEVEL METER do not swing past the right edge of the blue zone on loud peaks.

M. VIDEO LEVEL/STANDBY CONTROL
has two settings as follows.

VIDEO LEVEL.	Controls video signal levels manually when automatic level control is not used. To adjust, set the Level Meter Selector to VIDEO position, then turn this control so that the needle of the Level Meter positions in the blue zone.
STANDBY.	To keep the motor revolutions while the Function Selector is in STOP position. This function permits to have a still picture during playback and also to clean the slip rings in the head assembly.

N. AUDIO LEVEL CONTROL
Control the pre-amplifier audio signal level during E-to-E record operation when AGC/MANU Switch is in the manual position. To adjust, set the Level Meter Switch to AUDIO position then turn this control, so that the needle of the Level Meter does not swing past the blue zone during loud peaks.

O. AGC/MANUAL SWITCH
Set the video and audio recording mode to manual or automatic.

AGC (Automatic Gain Control) position
Video and audio recording levels are adjusted automatically.

MANU (Manual Control) position
AGC is disabled. Video and audio recording levels are adjusted manually by turning the AUDIO and VIDEO LEVEL CONTROLS.

1-4. OPERATING INSTRUCTIONS

This section describes operating modes and control functions. To prepare the VTR for operation, refer to Section 1-6. (for external equipment connections) and Section 2-1. (for tape-threading instructions).

Prelimimnary Setup

1. Press the gray POWER button. The pilot lamp, which illuminates the Level Meter, will light.

2. Before threading the tape, make sure that the VIDEO/STANDBY knob is pushed as far as it will go and that the Function Lever is in STOP position.

3. Set the TAPE COUNTER to (000) by pressing the reset button.

Record Mode

1. To put the VTR (video tape recorder) in the record mode, press the red RECORD button down until it is locked in the "down" position. The red jewel on the meter scale will light, indicating that the machine is in the record mode.

2. The monitor TV will display the signals supplied to the VTR for recording purposes. If the TV/CAMERA switch is in the TV position, the monitor will display the TV signals supplied by the "master" monitor. If the TV/CAMERA switch is in the CAMERA position, the monitor will display the video signals supplied by the video camera. Under these conditions, the VTR is said to be in the "E-to-E" mode of operation. That is, signals supplied by the signal source (TV or Camera) are processed by the circuits of the VTR and are sent back to the monitor for monitoring purposes. In effect, the entire system is operational except for the system link provided by the tape itself.

   NOTE: The SONY TV Monitor provides an "E-to-E" indication.

3. Set the AGC/MANU switch to AGC for automatic level control. If manual control is desired, set the MANU position and proceed as follows.

   A. Video recording level setting
   Set the METER SELECTOR switch to VIDEO. Adjust the VIDEO LEVEL control to obtain a reading in the blue zone. Do not set video level using extremely dark scenes. Switch channels to obtain a

picture with average grays, whites and blacks.

B. Audio recording level setting
Set the METER SELECTOR switch to AUDIO. Adjust the AUDIO LEVEL control to produce readings that do not swing past the right edge of the blue zone on loud peaks.

4. To start the recording, hold the RECORD button down while moving the FUNCTION LEVER to the PLAY position. This locks the RECORD button down in the record position.

5. To stop the recording, move the FUNCTION LEVER to the STOP position. The RECORD button is released by this action and the VTR reverts automatically to the playback mode.

Playback Mode

1. The VTR operates in the playback mode as long as the red RECORD button is not in the down position.

   NOTE: The monitor will display snowy raster in this condition as the playback circuit have no input signals.

2. To play a pre-recorded tape, the FUNCTION LEVER to the PLAY position. The monitor will display the signal previously recorded on the tape.

3. Video and audio output levels can be checked during playback by setting the METER SELECTOR Switch to the appropriate positions. A reading in the blue zone indicates standard output (1.4 Vp-p video and 0 dB (0.775V) audio).

4. To skip over a portion of the tape, move the FAST FORWARD lever to the left as far as it will go, and release it. The tape will advance rapidly. To resume normal playback, set the FUNCTION LEVER to STOP and then to PLAY. Tape will move again at the normal playing speed.

5. To stop the playback operation, set the FUNCTION LEVER to the STOP position.

Editing

1. Complete the connections between the Video Camera and the Videocorder. Set the TV/CAMERA switch to the CAMERA position.

2. Play the pre-recorded tape on the Videocorder by setting the FUNCTION LEVER to the PLAY position.

3. When the part where new pictures are to be added is reached, press the EDIT button. Then press the red RECORD button. The new recording from the Video Camera starts when the RECORD button is locked into place.

   NOTE: The EDIT button will come up when the RECORD button is locked.

4. When you finish editing, set the FUNCTION LEVER to the STOP position. To insert new recording between pre-recorded pictures and sound, press the EDIT button again 1-2 seconds before the end of the new recording and then set the FUNCTION LEVER to the STOP position.

   NOTE: When playing back the edited tape, it is normal that stripes may appear on the screen for about 1 second at the beginning (and the end) of the insertion.

Sound Dubbing

1. Connect a sound source (microphone, tape recorder, phonograph or radio, etc.) to the proper input of the Videocorder. Set the AGC/MANU switch to the AGC position. If you want to adjust the sound recording level manually, follow the instructions given in 'Manual Recording Level Adjustments'.

2. Set the TV/CAMERA switch to the CAMERA positions.

3. Turn down the volume of the Monitor.

4. Playback a pre-recorded tape on the Videocorder by setting the FUNCTION LEVER to the PLAY position.

5. When the desired portion for dubbing sound is reached, press the EDIT button. Then, press the SOUND DUB button. Sound dubbing starts when the SOUND DUB button is locked into place.

NOTE: The EDIT button will come up when the SOUND DUB button is depressed.

6. When you finish sound dubbing, set the FUNCTION LEVER to the STOP position.

1-5. OPERATIONAL PRECAUTIONS

1. To prevent accidental damage or needless wear on the video heads, observe the following.
   - (a) Do not operate the motor unless tape is threaded properly on the machine.
   - (b) Never attempt to thread the tape while the motor is running.
   - (c) Avoid leaving the motor running for extended periods while the tape is stationary.
   - (d) Do not operate the Function Lever if the tape is slack anywhere in the tape path.
2. To prevent erasure of pre-recorded tapes, remember not to put the VTR in the record mode while the pre-recorded tape is on the machine. Tape erasure takes place when the RECORD button is down and the FUNCTION LEVER is in the PLAY position. Sound erasure takes place when pressing the editing button first and then SOUND DUB button while machine is in the playback mode.

1-6. INPUT-OUTPUT CONNECTIONS

Fig. 1-3 shows all input and output terminals, the input signal requirements, and output-signal characteristics at each point. All connections between the Videocorder and other units of the system (monitors, cameras, microphones, etc.) are made at this jack panel located at the rear of the VTR. Normal camera connections (SONY CVC-2000ACE or CVC-2100-ACE) are made at the 6-pin CAMERA connector. Signal and power connections to other accessory equipments are as shown.

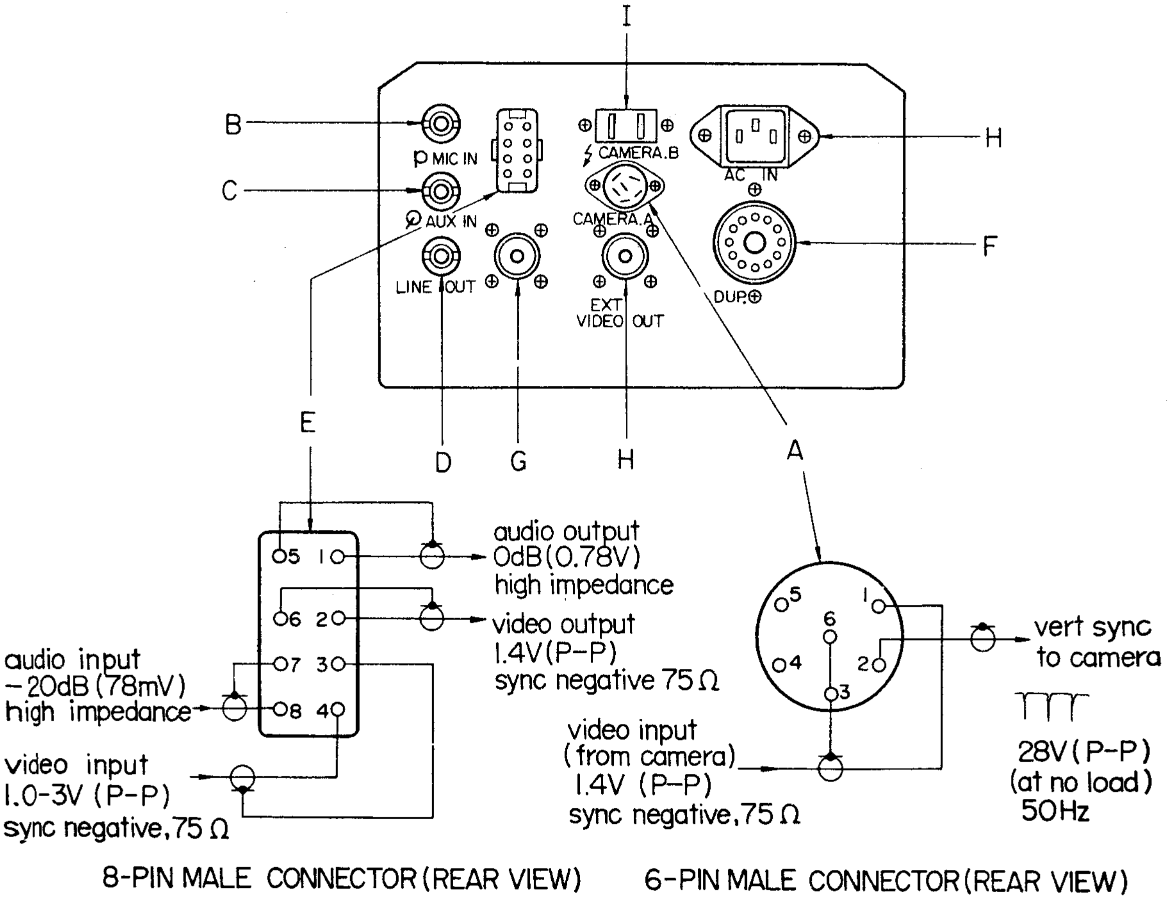

I
B
C
H
F
MIC IN
AUX IN
LINE OUT
CAMERA.B
CAMERA.A
AC IN
EXT VIDEO OUT
DUP
E
D
G
H
A
audio output
0dB(0.78V)
high impedance
video output
1.4V(P-P)
sync negative 75Ω
audio input
-20dB (78mV)
high impedance
video input
1.0-3V (P-P)
sync negative, 75 Ω
video input
(from camera)
1.4V (P-P)
sync negative, 75 Ω
vert sync
to camera
28V (P-P)
(at no load)
50Hz
8-PIN MALE CONNECTOR (REAR VIEW)
6-PIN MALE CONNECTOR (REAR VIEW)

Fig. 1-3. Input-output connetions and signal specificati ons.

A. Camera Jack (CAMERA A)
To connect the SONY Camera CVC-2000ACE or CVC 2100ACE.

B. Microphone Input Jack (MIC. IN)
Signal feed point for SONY microphone or others with similar characteristics. Signal level requirements: -65 dB (0.42mV), 250 - 600 ohms, single ended.

C. Auxiliary Jack (AUX. IN)
Provides an alternative input point for audio signals, studio feeds, record players and other sources of audio signal. Signal level requirements: -20 dB (0.08V). This jack is in parallel with pins 7 and 8 (7 ground) of the TV monitor jack.

D. Line Out Jack (LINE OUT)
Provides an additional audio-output feed to supply playback monitors or other audio systems. Signal level 0 dB (0.775V) across high (10K ohms) impedance. This jack is in parallel with pins 1 and 5 (5 ground) of the TV monitor jack.

E. TV-Monitor Jack (TV)
To connect SONY monitors or conventional TV sets by means of the SONY TV Adaptor. Video and sound interconnections to peripheral equipment are made at this jack.

F. Duplicate Connector (DUP.)
Usually this connector should be plugged in with the 12-pin short plug (supplied). When duplicating the tape, pull out the short plug and connect the SONY Duplicator for Videocorder (VDC-1).

G. Auxiliary Video Input (AUX VIDEO IN)
To connect an alternative source of video signal such as a commercial video equipment.

Signal level requirements:	1.0 to 3.0 volts p-p input impedance is 75 ohms unbalanced, sync negative.

H. External Video Output (EXT VIDEO OUT)
Provides connections for commercial Video Monitors, or video distribution equipment.

Video Output:	1.4 volts p-p. Output impedance is 75 ohms unbalanced, sync negative.

I. AC Outlet (CAMERA B)
Provide AC power (100V, switched) to SONY video camera only.

J. Line Out Jack (LINE OUT)
To permit audio connections to an external Audio system or a high impedance crystal earphone. Signal level is 0 dB (0.775V) across high impedance.

K. Power Cord Receptacle (AC IN)
Power requirements for 100 - 240V AC 50 ± 0.5 Hz.
Power drain 110 watts (VTR only).

SECTION 2

TAPE TRANSPORT AND SCAN MECHANISM

2-1. TAPE TRANSPORT

This section describes the mechanism of tape movement, in forward, fast forward, and rewind operations. Fundamentals of the slant-track scan system are also shown.

Tape Path

Figure 2-1 shows the path taken by the tape as it moves from the supply reel to the take-up reel. Tape passes first between the Tension-Brake Tape Guide (B) and the Tape-Guide Roller (C). The tension-brake guide senses tape tension and acts to apply braking pressure to the Supply-Reel Table to keep a uniform back tension on the tape. After the Tape Guide Roller, the tape runs past a Tape Guide (D), the full-track erase head (E) and Tape Guide 1 (F). These guides adjust the tape to cross the erase head at the correct height. In addition, Tape Guide 1 alters tape angle slightly so that the tape crosses the Left Tapered Guide (G) at the correct height and angle. The Left Tapered Guide acts to change the direction of the tape;

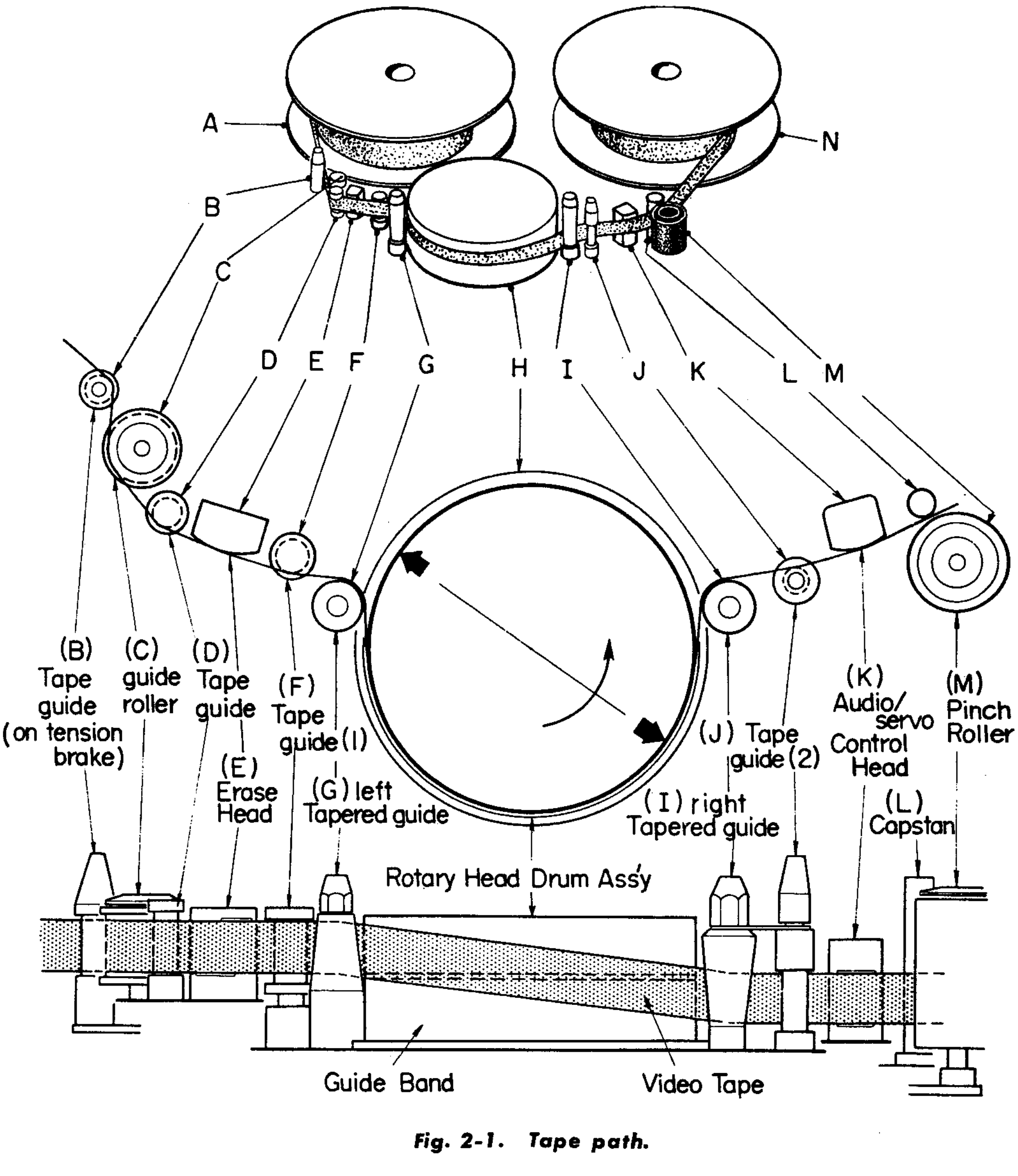

A
B
C
D E F G H I J K L M
N
(B) Tape guide (on tension brake)
(C) guide roller
(D) Tape guide
(E) Erase Head
(F) Tape guide (1)
(G) left Tapered guide
(J) Tape guide (2)
(I) right Tapered guide
(K) Audio/servo Control Head
(M) Pinch Roller
(L) Capstan
Rotary Head Drum Ass'y
Guide Band
Video Tape

Fig. 2-1. Tape path.

tape angles downward at this point, as it begins its path around the Rotary Head Drum Assembly (H). The tape now runs downward about 180^{0} around the circumference of the Rotary Head Drum Assembly. Since the video heads inside the assembly rotate in a horizontal plane, they trace tracks that slant across the width of the tape. As the tape leaves the Rotary Head Drum assembly at the right side, it is bent back to the horizontal by the Right Tapered Guide (I). Tape then passes the Automatic Shutoff Sensor and Tape Guide 2 (J). If tape should run out, the Automatic Shutoff Sensor moves towards the front of the machine and actuates a microswitch that interrupts a-c input power. Following Tape Guide 2 (J), the tape bears against the Audio/Control track heads (K). Here the audio track is recorded on the upper edge of the tape and control pulses are recorded on the lower edge. These control-track pulses provide the timing reference for the servo system during playback.

Finally, the tape is squeezed between the Capstan (L) and the Pinch Roller (M), and fed to the Take-Up Reel (N). The latter is powered through a friction-clutch arrangement which maintains a uniform tension on the tape as it leaves the capstan.

WARNING

The tape is guided with very great precision along its path between the Erase Head and the Capstan. The slightest deviation in the tape path will make the rotating video heads fail to track the paths of previous recordings. Therefore, treat the machined parts of the Rotary-Head drum assembly and the Tape Guides with extreme care. Avoid making any mechanical adjustments in the tape path other than those covered in this manual. Keep metal tools away from the components in the tape path and keep the unit covered when not in use.

Tape Threading

Place a full reel of tape on the Supply Reel Spindle (left side). Unwind about two feet of tape and thread the tape as shown in Fig. 2-2. Wrap the end of the tape around the hub of the Take-Up Reel (right side) and turn the reel by hand to take up excess slack. Make sure that the tape passes between the Tension Brake Tape Guide and the Tape Cuide Roller. Also be sure that the tape bears against the Audio/Control head and is not outside the shield plate for the head.

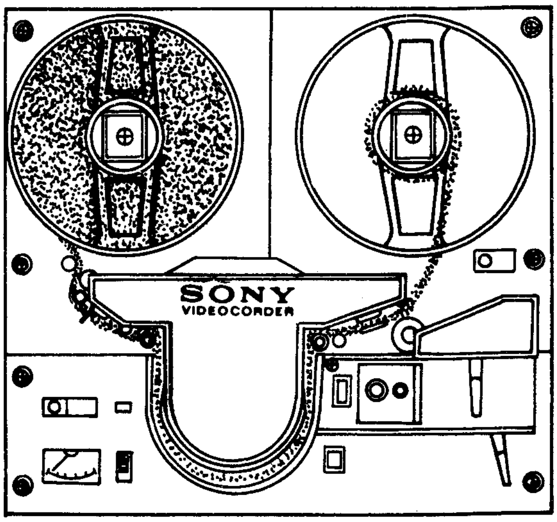


Fig. 2-2. Tape threading.

STOP Mode

Figure 2-3 shows a simplified diagram of the tape-transport mechanism as it appears when the Function Lever is set to STOP. In this mode, both tape reels are braked, and the Pinch Roller is pulled back from the Capstan.

Details are as follows. The Function Lever and the Function Cam (C) are shown in the stop position. Pinch Lever B is rotated counterclockwise about its pivot as shown by the small arrows. The pawl of Pinch Lever B presses against Pinch Lever A to move the pinch roller (F) away from the capstan. Pinch Lever B also rotates the Tension Brake Control Lever (G) about its pivot so that the Tension-Brake-OFF Rod (H) is pulled to the right. This rotates the Tension-Brake-OFF Assembly (I) about its pivot so that the Tension Brake Tape Guide (J) is pushed out of the tape path and the brake shoe (K) is pulled back from the Supply Reel Table (L).

The STOP position of the Function Selector Cam also causes the Push Rod (M) to be pulled towards the front of the machine. This pulls Rewind Idler Assembly (N) downwards slightly so that it rolls against the left Rewind Idler. The latter swings to the left as shown and bears against the hub of the Supply Reel Table. This effectively brakes the Supply Reel Table because the left Rewind Idler is free to turn in one di-

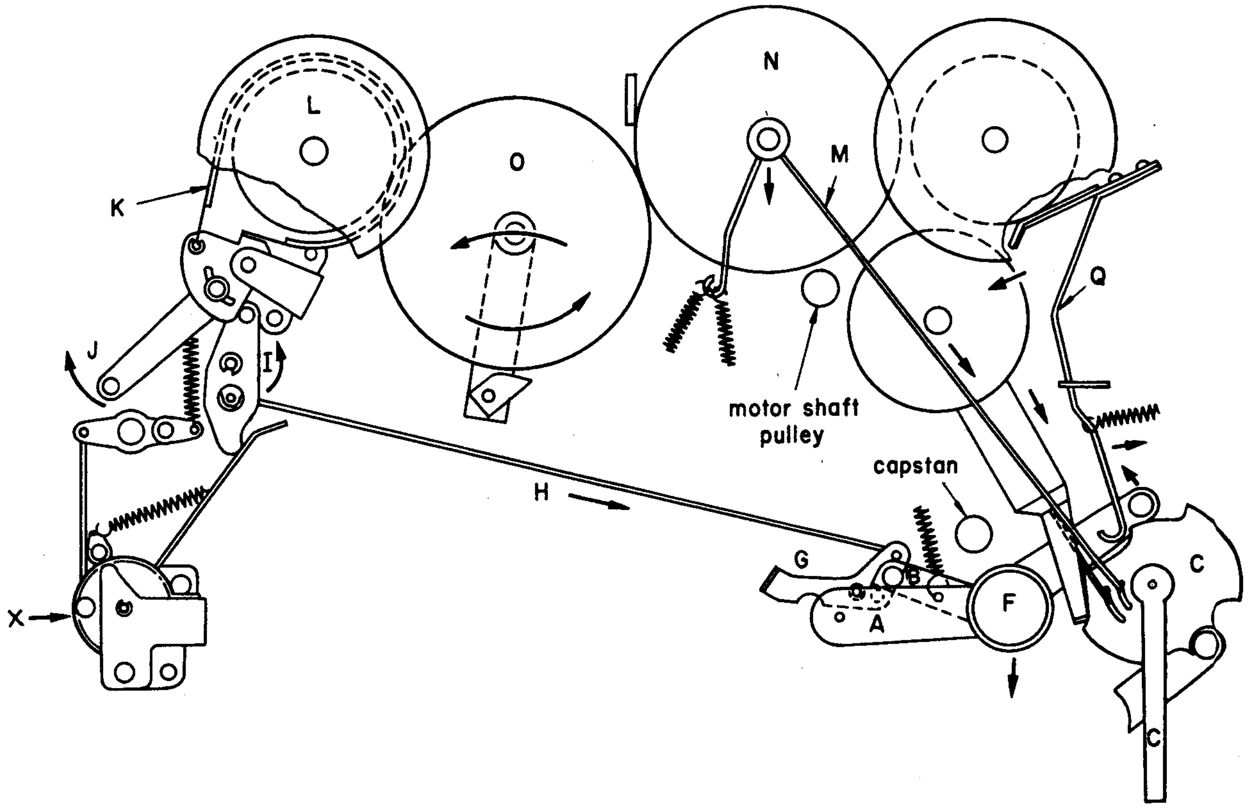

L
O
N
M
K
J
I
Q
motor shaft pulley
capstan
H
G
B
A
F
C
C
X

Fig. 2-3. Tape transport, Stop mode.

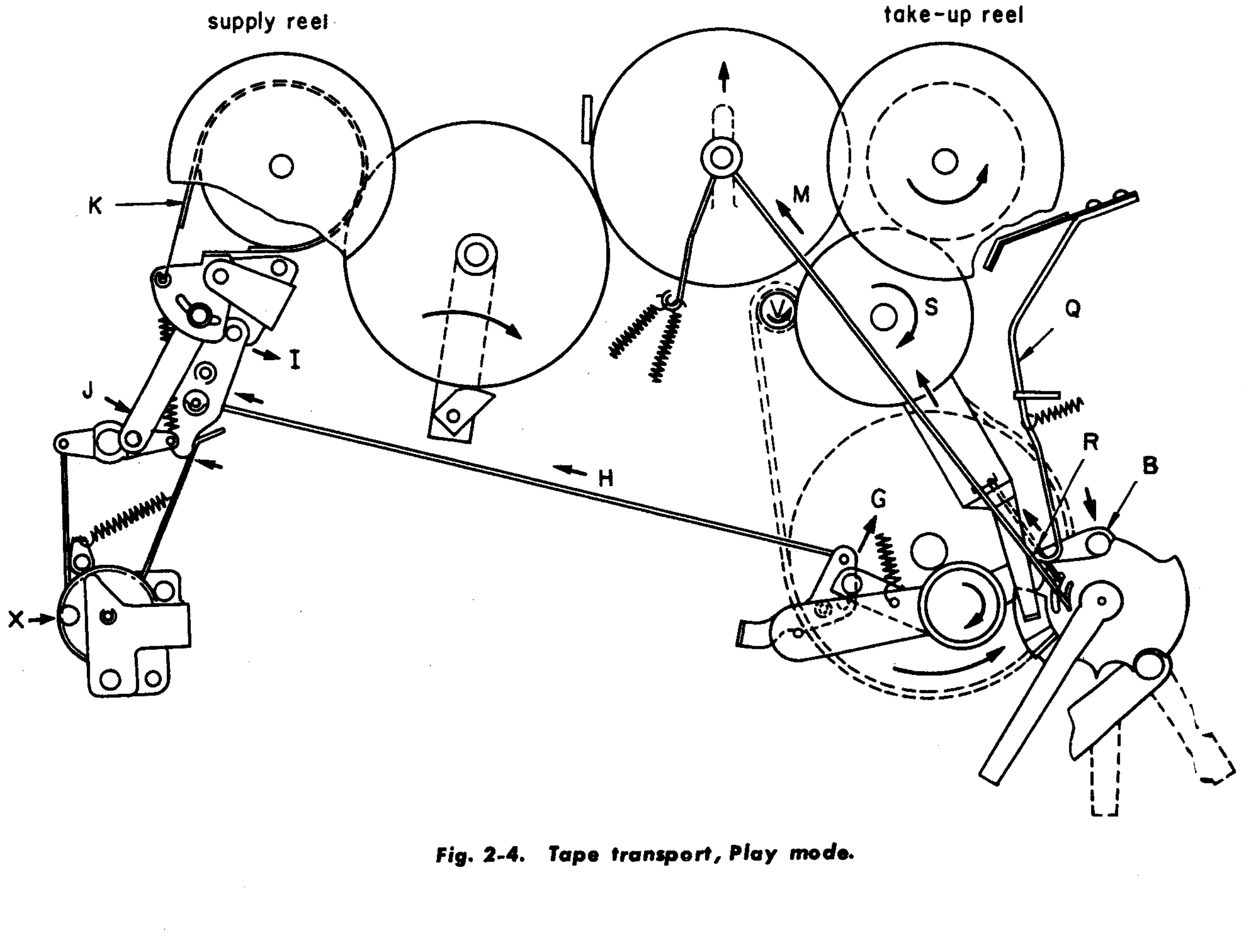

supply reel
take-up reel
K
M
S
Q
I
J
H
G
R
B
X

Fig. 2-4. Tape transport, Play mode.

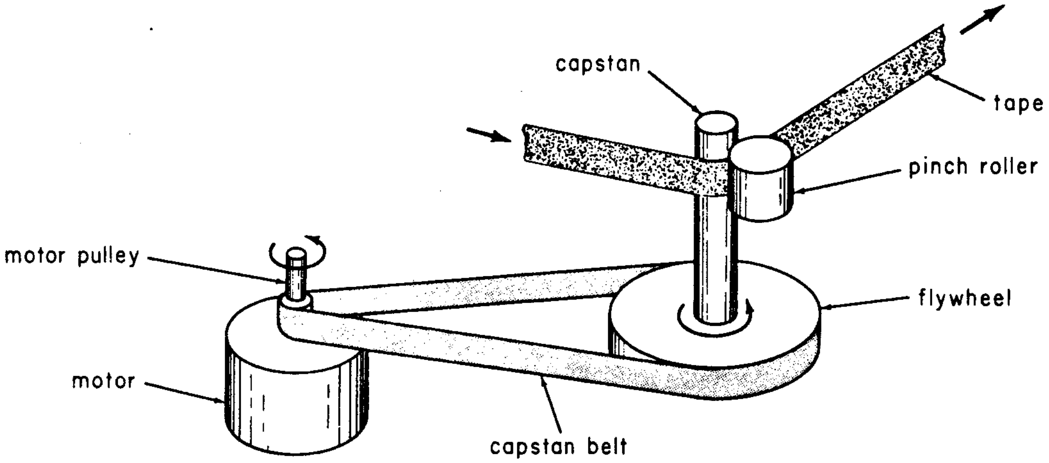


Fig. 2-5. Capstan drive system.

rection only. A directional brake (P) prevents clockwise rotation of the left Rewind Idler. As long as the left Rewind Idler and the Supply Reel table are in contact, the Supply-Reel Table cannot turn in the direction that pays out tape.

The bottom end of Brake Lever (Q) is released by the Function cam and is pulled around its pivot by a spring so that the brake shoe presses against the hub of the Take-Up Reel Table. This brake shoe has directional characteristics. It exerts greater braking force when the Take-Up Reel Table is turning clockwise, as it is during rewind operations. Greater braking force is needed to stop the Supply Reel table at the end of rewind as the table turns rapidly during the rewind operation.

Play Mode

Figure 2-4 shows the transport mechanism with the Function Lever set to PLAY. In this mode, the tape is powered by the Capstan. All brakes are off, and the Take-Up Reel is powered.

With the Function Cam in the PLAY position, the Pinch Lever (B) turns clockwise about its pivot and releases Pinch Lever (A). The latter swings the Pinch Roller up against the Capstan where it is held against the Capstan by spring tension. Push rod (M) pushes the right Rewind Idler up to its topmost position. This permits the left Rewind Idler to swing away from the hub of the Supply Reel and the Supply Reel is free to turn.

Tape is driven by the capstan as it is squeezed between the Pinch Roller and the rotating capstan. Details of the capstan drive system are shown in Fig. 2-5. A pulley at the top of the motor drives the large pulley that is attached to the lower end of the capstan shaft. This weighted pulley also serves as a flywheel.

Braking force is removed from the Take-Up Reel as the lower end of the Brake Lever (Q) is shifted to the left by the Function Cam. The lever swings about its pivot and the brake shoe moves away from the Supply-Reel hub.

Push Rod (H) moves left through the action of Pinch Lever (B) on the Tension Brake Control Lever (G). This release the Tension-Brake assembly so that the guide (J) swings against the tape, and the Tension-Brake shoe (K) swings against the hub of the Supply Reel Table.

When the tape tension is increased, the Tension Brake (J) is swing counterclockwise to release brake shoe (K) and reduce the tape back tension. The amount of tape back tension is set by the skew control (X).

The Play position of the Function Cam allows Push Rod (R) to move in the direction shown. Spring tension pulls the Idler Plate Assembly (T)

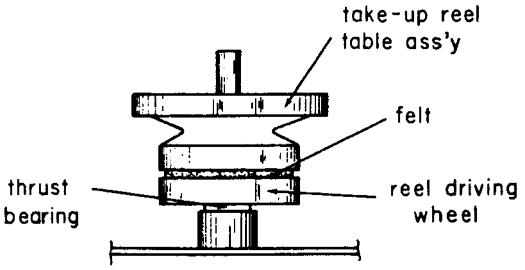


Fig. 2-6. Detail of Take-Up Reel assembly.

so that the Take-Up Idler Assembly (S) bears against the motor-shaft pulley (V) and the hub of the Take-Up table at the same time. Thus, torque is transferred to the Take-Up Reel. However, drive to the Take-Up Table is not direct. The Take-Up Table is assembed as shown in Fig. 2-6. The idler drives the lower part of the table, which is joined to the upper part of the table by a felt friction clutch.

Thus the top of the Take-Up Table can slip and adjust itself to the rate at which tape is payed out at the capstan.

Fast Forward

In this mode of operation the tape transport is in the PLAY mode, but the Take-Up Table is driven directly by the Idler (S). When the FAST FORWARD lever is moved to the left, the FAST FORWARD cam tilts the Idler Plate Assembly as shown in Fig. 2-7a. As a result, the idler "runs up" and engages the top part of the Take-Up Table directly as shown in Fig. 2-7b.

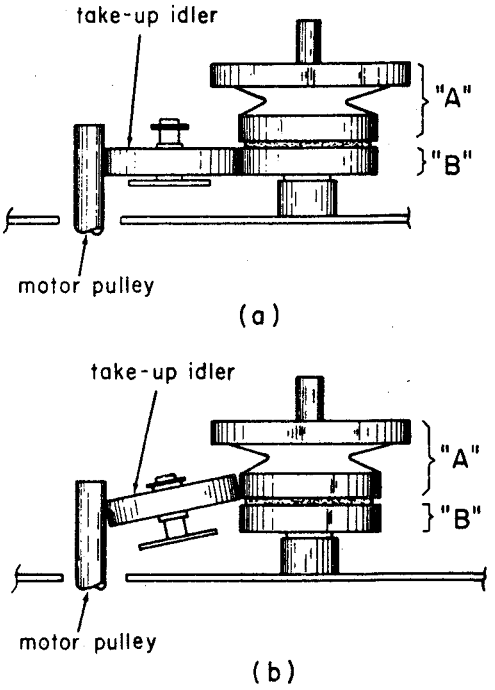


Fig. 2-7. Detail of Fast-Forward drive system.

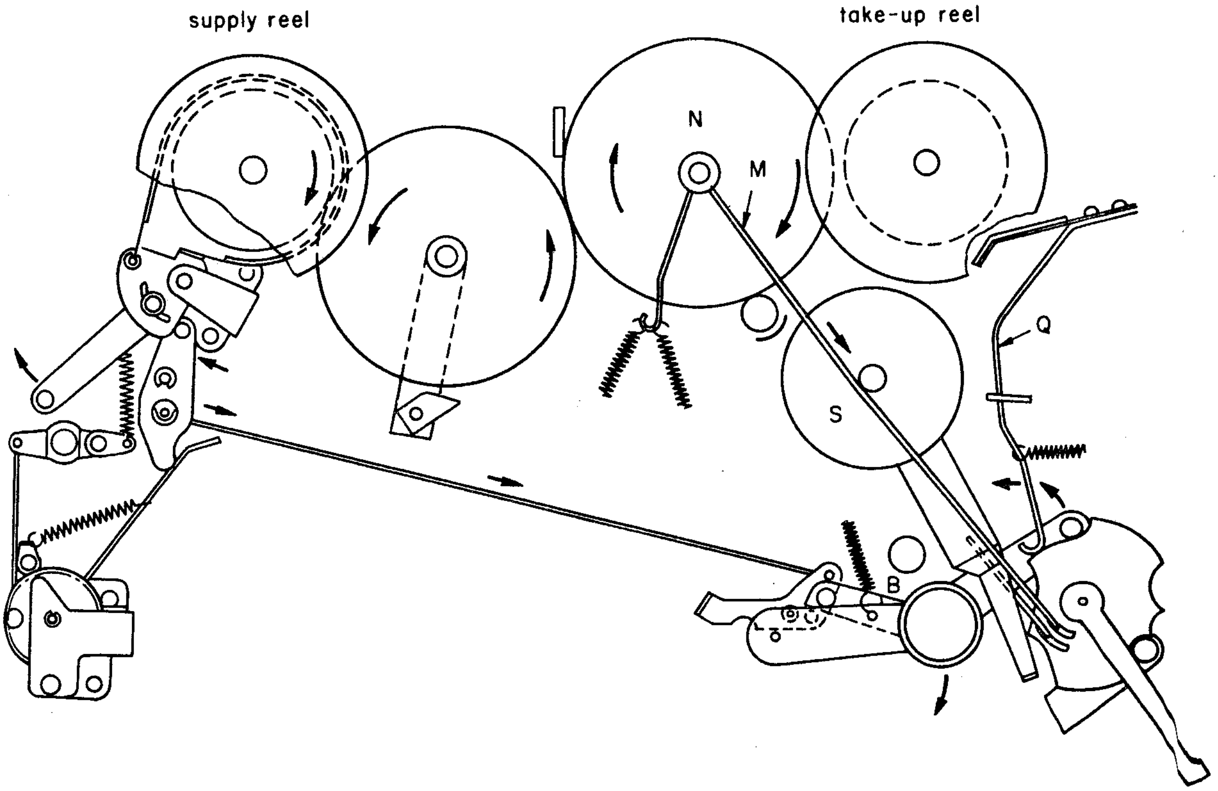


Fig. 2-8. Tape transport, Rewind mode.

Now the Take-Up Table is driven directly. In addition the Pinch Roller (F) is pulled back from the capstan to allow the tape to pass freely. A section of the FAST FORWARD cam lifts the right end of Pinch Lever B to accomplish the release of the Pinch Roller.

Rewind Mode

Figure 2-8 shows the Tape Transport in the REWIND mode. During rewind, reverse drive is applied to the Supply-Reel table, the Pinch Roller is pulled back from the Capstan, and the Take-Up table is free to turn.

With the Function Cam in its maximum counterclockwise position, both the Idler assembly (S) and Push Rod (M) are pulled towards the front of the machine. This disengages Idler (S) and brings the right Rewind Idler (N) against both the motor shaft and the left Rewind Idler. The latter shifts its axis so as to press the left Rewind Idler against the hub of the Supply Reel. Hence the Supply Reel is driven directly in the direction (reverse) shown by the arrow. The Pinch Lever (B) is in the same position as it is in the STOP mode, so that the Pinch Roller is disengaged from the Capstan and the Tension Brake is disengaged from the Supply Reel table. In addition, the Function Cam pushes the lower end of Brake Lever (Q) to the left. The lever pivots so that the brake shoe is pulled away from the hub of the Take-Up reel.

2-2. SLANT-TRACK RECORDING

The principle of slant-track (helical) scanning, as used in the SONY VTR, is shown in Fig. 2-9. This principle is implemented in the Rotary Head Drum Assembly, the most vital part of the recording system. Two magnetic heads, mounted at the ends of a rotating disk beam, scan the tape. The plane of the rotating heads is parallel to the chassis, but the tape wraps around the head-drum assembly at an angle to the chassis. A recorded track thus slants across the tape as shown. This system results in a high relative speed between the heads and the tape.

Signals are applied to the rotating heads through a brush-and-slip ring assembly.

The heads rotate at 25 rps. Since each head is in contact with the tape for exactly 180° (a half revolution), a single scan takes 1/50th of a second. Thus, a complete vertical field is recorded on a single scan (track). An accurate servo system controls head rotation with respect to vertical sync pulses so that the start of a scan coincides with the beginning of a vertical field.

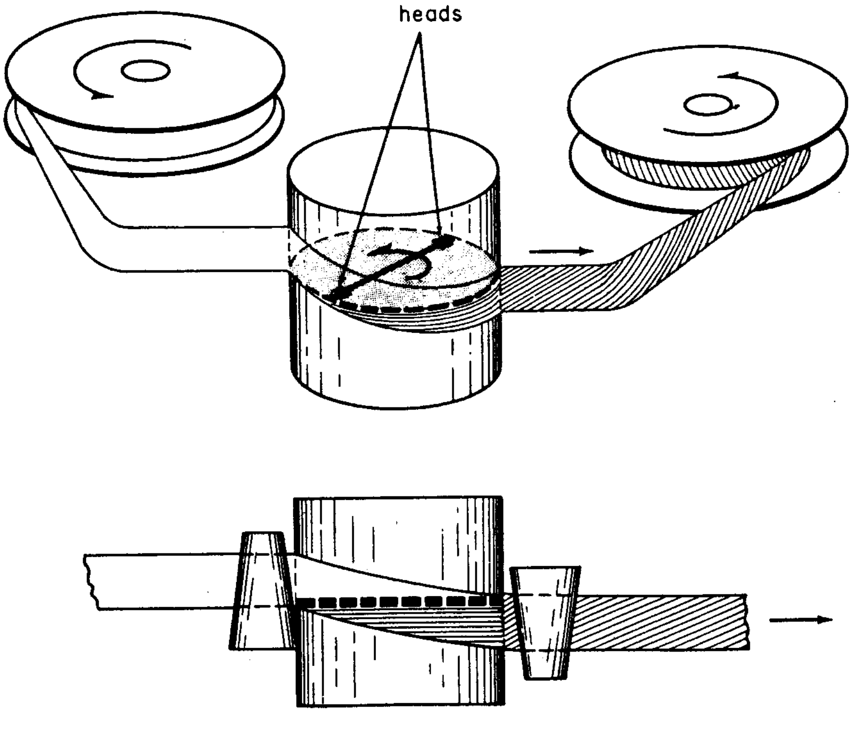


Fig. 2-9. Helical or Slant-track recording system, simplified.

2-3. ROTARY HEAD DRUM ASSEMBLY

Figure 2-10 shows the mechanical components of the Rotary Head Drum Assembly. The purposes of the stationary components–the tape and tapered guides, the Guide Band, and the drum itself–are as follows.

1. to guide the tape around the circumference of the drum for an angle of slightly more than 180° (wrap angle).
2. to give the tape the precise downward slant of 2 degrees 15 minutes as it passes around the drum. It is this angle that yields slant-track recording.

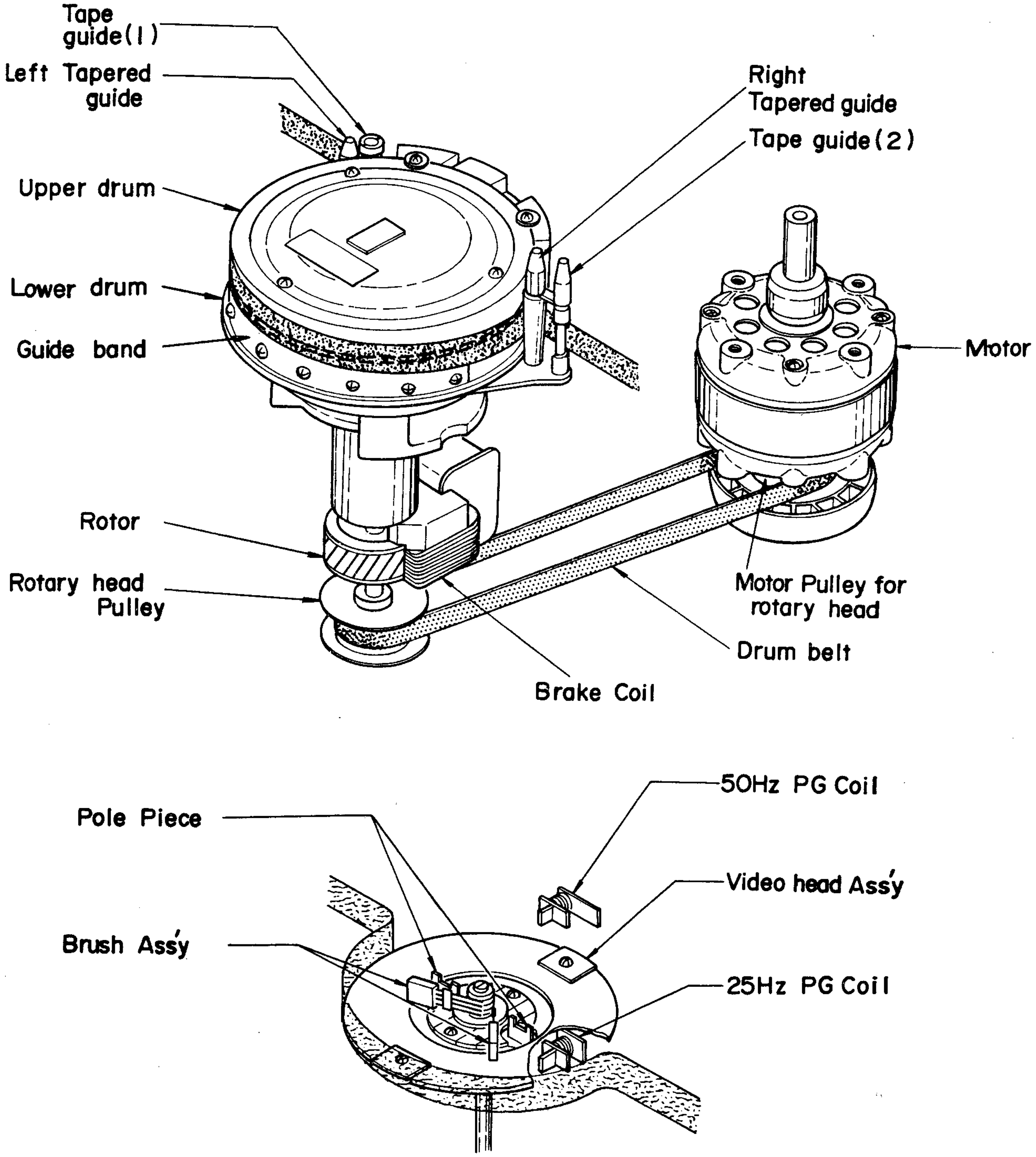

Tape guide(1)
Left Tapered guide
Upper drum
Lower drum
Guide band
Rotor
Rotary head Pulley
Right Tapered guide
Tape guide(2)
Motor
Motor Pulley for rotary head
Drum belt
Brake Coil
Pole Piece
Brush Ass'y
50Hz PG Coil
Video head Ass'y
25Hz PG Coil

Fig. 2-10. Rotary Head Drum Assembly.

3. to keep the tape absolutely flush against the surface of the drum and maintain precise tape penetration by the rotating heads.

As the tape leaves the Left Tapered Guide its inner surface runs flush against the circumference of the drum. In addition the lower edge of the tape remains in contact with the Guide Band that surrounds the front part of the lower half of the drum. Thus the tape guides and the Guide Band determine, precisely, the height of the tape with respect to the rotating heads at every point of the drum. Misadjustment of any of these parts may result in incorrect tape position at some point above the Guide Band. Extreme precision is used in the assembly of the drum, the Guide Band, and the tape guides to maintain proper tape movement around the drum.

Correct tape tracking also requires that the upper and lower halves of the drum be absolutely parallel and concentric with the shaft of the rotating heads. This requires very precise machining and polishing of drum surfaces and accurate positioning of the top half of the drum with respect to the bottom. Since the top half of the drum is made removable for service, provision is made to reinstall the top half in its original position. A carefully positioned Locating (butt) Plate, at the rear of the Rotary Head Drum Assembly, acts as the position reference. It permits the top half to be returned to its origianl position following service of internal parts.

In addition to accurate positioning of the tape, the rotating heads must be precisely located with respect to the position of the tape. For this reason the height of the rotating platform on which the rotating head assembly is mounted is very accurately determined. Also the bearings that support the spindle of the rotating platform are set in place using unique fabricating methods to make sure that the spindle and the upper and lower drum halves share the same axis.

Rotary Head Drum Drive System. Torque is transferred from the lower pullev of the drive motor to the pulley at the bottom of the Rotary Head Drum Assembly through a rubber belt.
The head pulley has a slightly smaller diameter than the motor pulley so that the rotary heads turn faster than the motor. Pulley ratios are set to give a free-running speed of 25.35 to 25.41 revolutions per second. Servo braking slows the rotary heads to 25 revolutions per second. For proper recording purposes, video signal is applied to "A" and "B" rotating heads alternately. As the result, alternate fields are recorded. During playback, "A" and "B" heads are controlled to scan the same tracks which were recorded by "A" and "B" heads respectively by means of servo system. In this way two different fields are played back to form a complete frame on the screen of the monitor.

The tape is wrapped around the Rotary Head Drum for more than 180°. The "wrap angle" is actually large enough so that an overlap exists between the signals read out by the heads during playback. This overlap occurs during the vertical blanking interval and is not visible on the screen.

2-4. SERVO AND PULSE-SYSTEM PRINCIPLES

Basic principles of the servo and pulse system of the SONY VTR are shown simplified in Fig. 2-11. The rotational speed and angular position of the heads are precisely referenced to 50-Hz sync pulses by means of a magnetic-brake servo system. In this system the head table (the platform on which the heads are mounted) is belt driven at a speed greater than 25 rps. The servo system controls a magnetic brake that slows the head table to precisely 25 rps.

During TV record operations, separated 50 Hz sync signals serve as the timing reference for the servo. The arrival of every-other 50-Hz sync pulse is compared with a 25-Hz pulse generated in the Rotary-Head Drum assembly. A single pole piece, mounted on the table that supports the heads, cuts the field of the Frame PG coil (25-Hz) once for each revolution. The comparator system of the servo controls brake current to maintain the correct time reference between the sync pulses and the 25-Hz pulses. If the 25-Hz PG pulse is too early, more current is applied to the brake coil and the head table slows down. Drive-belt elasticity absorbs the difference in instantaneous angular displacement. Late 25-Hz PG pulses cause a reduction in brake current and the head platform is permitted to speed up.

During CAMERA-RECORD operations constant current that set by adjustable resistor R flows in the magnetic brake coil, so the rotational speed of the heads is held constant.

The servo system also produces a 25-Hz timing pulse that is recorded on the lower edge of the tape at the Audio/Control head. During

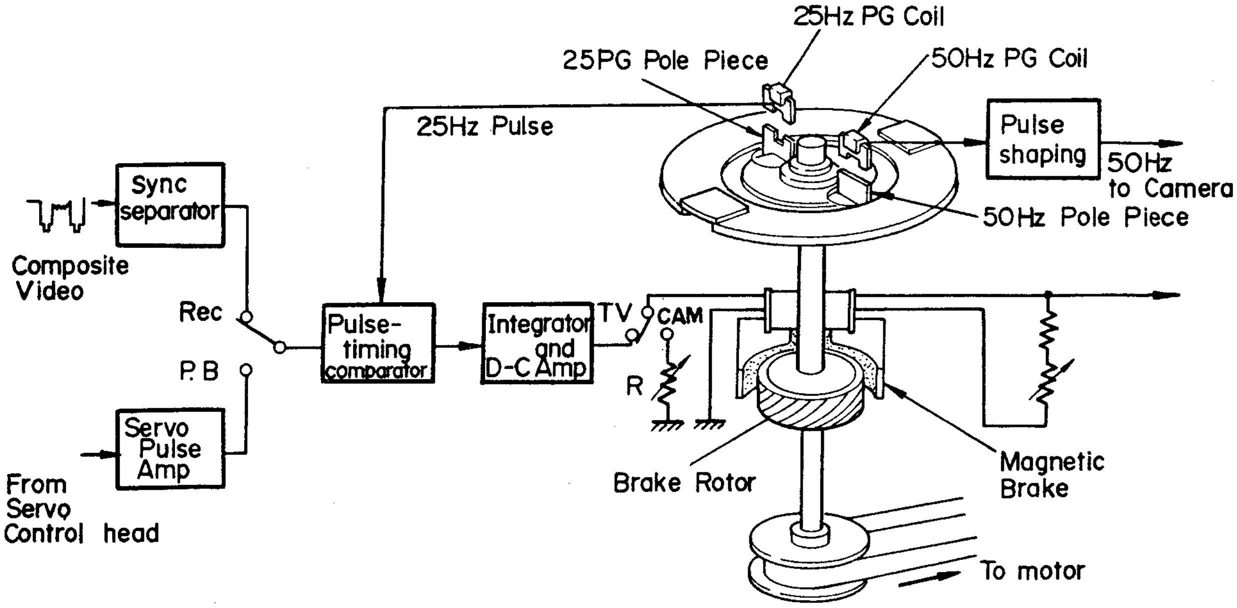

25Hz PG Coil
25PG Pole Piece
50Hz PG Coil
25Hz Pulse
Pulse shaping
50Hz to Camera
50Hz Pole Piece
Sync separator
Composite Video
Rec
P.B
Pulse-timing comparator
Integrator and D-C Amp
TV
CAM
R
Servo Pulse Amp
From Servo Control head
Brake Rotor
Magnetic Brake
To motor

Fig. 2-11. Servo system principle.

playback operation, the recorded control pulses serve as the reference for the servo system.

The 50-Hz pulses are generated in a coil mounted above the rotating video heads. It is called the Field PG (pulse generator) coil. A pair of pole pieces, mounted 180° apart on the top of the rotating assembly, induce 2 pulses per revolution or 50 pulses per second. These pole pieces are very precisely located to produce pulses that coincide with line and half-line periods on alternate fields.

Avoid handling the upper pole pieces on the rotating video-head assembly.

Loss of signal interlace can result.

The 50 PG pulse is also routed to the camera to synchronize the 50-Hz deflection oscillator in the camera.

Details of the Servo and Pulse system are found in Section 3.

SECTION 3

CIRCUIT DESCRIPTION

The following describes the functions of all stages and controls. The text follows signal paths and lists stages by the transistor symbol number at the left margin. Refer to the block diagram on page 3-5.and the schematic diagram on page.

FM Recording. Video information is recorded in the form of a frequency-modulated carrier. During playback the FM carrier is demodulated and filtered to reproduce the original video signal. FM recording affords several advantages. It improves signal to noise ratio, as the tape is driven to saturation by the carrier signal. It eliminates amplitude variations incurred in the recording/playback process. Finally, high frequency bias, common in audio tape recorders, cannot be used with video signals that extend to several megahertz.

3-1. VIDEO CIRCUITS

VIDEO INPUT - PIN 4 and 3 (3 ground) of the TV jack for TV recording.

PIN 1 and 6 (6 ground) of the CAMERA jack for camera recording.

Auxiliary Video Input jack.

Stage/Control	*Function*
Video Level Control R702	The 75 ohm input cable is terminated by the parallel combination of R702, R-201 ("R" circuit board) and Sync separate input circuit. R702 adjust the video input level to the system at manual mode and determines maximum deviation of the FM modulator.
Low-Pass Filter LPF-101 (A11 Board)	Rejects video signals at the high end of the band, such as the 4.53 MHz color subcarrier and the 5.5 MHz audio IF signal.
(AGC Operation)	Signals from the INPUT terminal are applied to the input of the AGC system (R201) and the manual video level control (R702) in parallel. The AGC-MANU switch (SW701-5) selects the output of R702 or the AGC system for further signal processing. The action of the video AGC section is as follows.
AGC Input Level R201	Video from the arm of R201 is applied to two circuits. Full output is applied to a diode clamp D201, followed by half-wave rectifier whose d-c output is proportional to average white level. This DC level is amplified by the two stage emitter follower X201 and X202. The second output of R201 is tapped down in a voltage divider (R-202, R203) and applied to the emitter of X203. Transistor X203 acts as the variable gain component. Its operating point is controlled by the DC output of X202. For example, an increase in video level results in a greater positive output from X202. This in turn causes X203 to conduct more heavily. As a result, the h_{fe} and input resistance of X203 decrease. This results in a lower video output from X203. A decrease in video input level has the opposite effect and output is held constant for a wide range of input signals. A two stage video amplifier consisting of X204 and X205 brings video level up to the standard value. This amplifier employs a negative feedback loop to maintain video bandwidth.
AGC Output Control R219	Adjusts the output of the AGC system to the standard value.

Stage/Control	*Function*
Video Amplifiler X101, X102 X103	This three-stage amplifier amplifies the video signal to the level required by FM modulator. Parallel circuit of R101 and C101 provide pre-emphasis operation for input video signals.
Carrier Frequency Adj. R301, C302 D301	These components form a clamping circuit that clamps the tip of sync to the reference voltage picked off at the arm of R301. This reference voltage determines the sync-tip (or no-signal) frequency of the FM modulator. R301 is set to establish a no-signal carrier frequency of 2.1 MHz.
White Clipper R305, D302	Diode D302 limits the maximum positive signal (white peaks) to the voltage picked off at the arm of R305. This potentiometer is set so that white peaks do not cause overmodulation.
Modulation Driver X301	This emitter follower stage applies all video signal, including d-c levels, to the FM modulator. It provides the necessary low-impedance drive to the modulator stage.
FM Modulator X302, X303	The modulator is a free-running symmetrical multivibrator. Frequency control is achieved by returning both bases to the low-impedance source of modulating voltage – the emitter of X301. X302 and X303 are a matched pair. Replace both in case of failure.
R314, R317 C308	These controls are adjusted to obtain a symmetrical output waveform (equal pulse durations and slopes for each half cycle). Waveform symmetry is important as it determines the extent to which carrier energy can be removed from the demodulated signal. Push-pull modulator output is changed to a single-ended feed by T301.

Stage/Control	*Function*
Record Amplifiers X307, X308, X309 (X304, X305, X306)	Amplifiers X307, X308 and X309 (X304, X305 and X306) drive video heads "A" ("B") during record operations. Frequency characteristics of the amplifier equalize those of the recording head. X308 (X305), an emitter follower, prevent modulator loading by the head driver X309 (X306). B + for X307, X308 and X309 (X304, X305 and X306) is supplied by SW 708-1 (the Function Cam Switch) and SW 707-1 (Record Switch) in series. This means that the RECORD button must be down, and the FUNCTION LEVER set to PLAY, before the record amplifier can operate.
Recording Current Adj. R320, R321	R320 and R321 adjust the level of RF signal (Frequency Modulated Video Signal) applied to recording heads "A" and "B" respectively.
Video Heads "A" and "B"	Slip-ring Assembly (1 to 4) and brush assembly couples each recording current to each recording heads. During playback operation both A and B head outputs are coupled through separate slip rings (1 to 4) and brushes to their respective Playback Amplifiers.
Playback head Amplifiers T302, X310 and X311 T303, X314 and X313	Two separate amplifiers are used to amplify the weak signals supplied by the video heads during playback. Frequency characteristics are adjusted to equalize head to tape characteristics. X310 and X313 are specially selected low-noise transistors.
Resonance Adj. C322 and C330	These components adjust the resonant frequency of the playback head preamplifier circuits, including the input transformer and the transistor.

Stage/Control	*Function*
Peak Adj. **R351, R363**	**These components adjust the peak value of resonant frequency preset by C322 and C330. L305 and L306 compensate resonant point.**
Eqalizer Adj. **R378, L307**	**Mid-range responce of playback RF signal is compensated by R378 and L307.**
Balance Adj. **R372**	**The outputs of the playback preamplifiers are mixed across R372. This control is set to balance the outputs of the "A" and "B" channels.**
Playback Amplifier **X316, X317**	**The mixed signals form an uninterrupted carrier in the playback amplifiers. The amplification provided in these stages raises signal level to the value required to drive the limiters.**
Limiters 1-5 D401 - 410 X401 - 406	The limiter stages eliminate amplitude variations caused by the magnetic record/playback system. Limiting is accomplished by the diode pairs with interstage amplification supplied by transistors X401 through X406.
Limiter Balance R428	The final limiter is balanced by adjustment of R428. This control is adjusted to produce a symmetrical square wave at the output of the limiter section.
Limiter 6 X407	Supplies a low-impedance source of carrier signal to the FM demodulator input transformer T401.
FM Demodulator T401 D411, 412 X408 LPF401	The limiter output is differentiated through T401 (pulse transformer) to produce a chain of positive and negative spikes. The diodes D411 and D412 conduct on alternate half cycles to produce two positive output pulses per input cycle. Thus the carrier frequency is effectively doubled and placed outside the video passband. By integrating the pulse output, in the low-pass filter (LPF-401) that follows X408, a video output is obtained that is proportional to pulse frequency.
Demodulator Balance Adj. R435	R435 is set to balance the pulse output of the demodulator. When perfect balance is achieved there is no energy at the carrier frequency of 2.1 MHz.
Video Amplifier 2 **X409, C422**	**Video output from the demodulator is amplified by X-409. C422 in the collector circuit of X409 reduces high-frequency gain to provide de-emphasis.**
Video Amplifier -3 **X410**	**Emitter follower X410 provides a low impedance source of signal for the noise cancellation, meter amplifier and video Amp-4 (X411).**
Video Output Level Adj. **R444**	**R444 adjusts the video output level. It is adjusted to provide 1.4Vp-p at the output terminals.**
Video Amplifier -4 **X411**	**This emitter follower X411 drives 75 ohm output system of the VTR.**
Noise Cancellation Adj. **R445**	**R445 is adjusted to achieve maximum noise cancellation without loss of resolution.**
Noise Cancellation Circuit **X412, D413, D414**	**The noise cancellation circuit effectively separates noise from the video signal, inverts it, and feeds it back into the video circuits to achieve noise cancellation. Feed to the noise cancellation circuit is taken from the emitter of X410, and**

Stage/Control	*Function*
	is coupled through C426 and C427 which pass only high video frequencies. X412 amplifies and inverts the high-frequency signal, which contains narrow spikes that represent leading and trailing edges of video signals and noise. The noise component is small in amplitude and is resolved about the zero axis of the signal. Diodes D413 and D414 function as a "noise detector". Large video spikes are removed by the diodes, and the signal that remains is primarily noise signal feeds back into the video circuits at the base of X411.
Video Meter Circuit X413, D415, D416	The circuit consists of an amplifier, X413, which drives the rectifiers. D415 and D416 form a voltage doubler that supplies direct current, proportional to average video level, to the meter.

3-2. PULSE AND SERVO CIRCUITS

Refer to simplified block diagram of the servo system in Fig. 3-1, as well as the over-all block diagram and the schematic diagram. All switches are shown in the TV-RECORD mode.

Stage/Control	*Function*
Sync Amplifier X414, X415	Composite video signal is fed to a Sync Amplifier, X414, mounted on the "A12" Board. The emitter follower, X415, provides a low impedance source of signal for the sync separator.
Sync Separator X416	This stage conducts during positive peaks and separates sync from the remainder of the signal.
Pulse Amplifier X105, X106	Output from X416 is fed to Sync Pulse Amp. through an integrator circuit (R478, C-441, R479 and C442) that removes horizontal sync pulses and shapes the separated vertical sync pulse.
Monostable Multi X505, X506	In the absence of signal, the stable state of the monostable Multi., is X505 cutoff and X506 conducting. A delayed negative sync pulse, coupled through D503, cuts off X506 and flips the Multi, into the unstable state. X506 remains cut off until C514 discharges through R524 and R525. Pulse duration is about 25 m sec, long enough for the circuit to ignore the next 50 Hz sync pulse. Thus the Multi. runs at 25 Hz and is triggered by every other sync pulse.
Integrator/Pulse Amplifier X507	Output from the monostable Multi Vibrator is integrated by R531 and C517 to form the waveshape shown in ⑤ of Fig. 3-1. Emitter follower X507 feeds the signal to the gate circuit.
Gate X508	The gate X508 is turned on by the amplified 25 PG pulse applied between base and emitter. For the duration of the 25 PG pulse the integrated signal

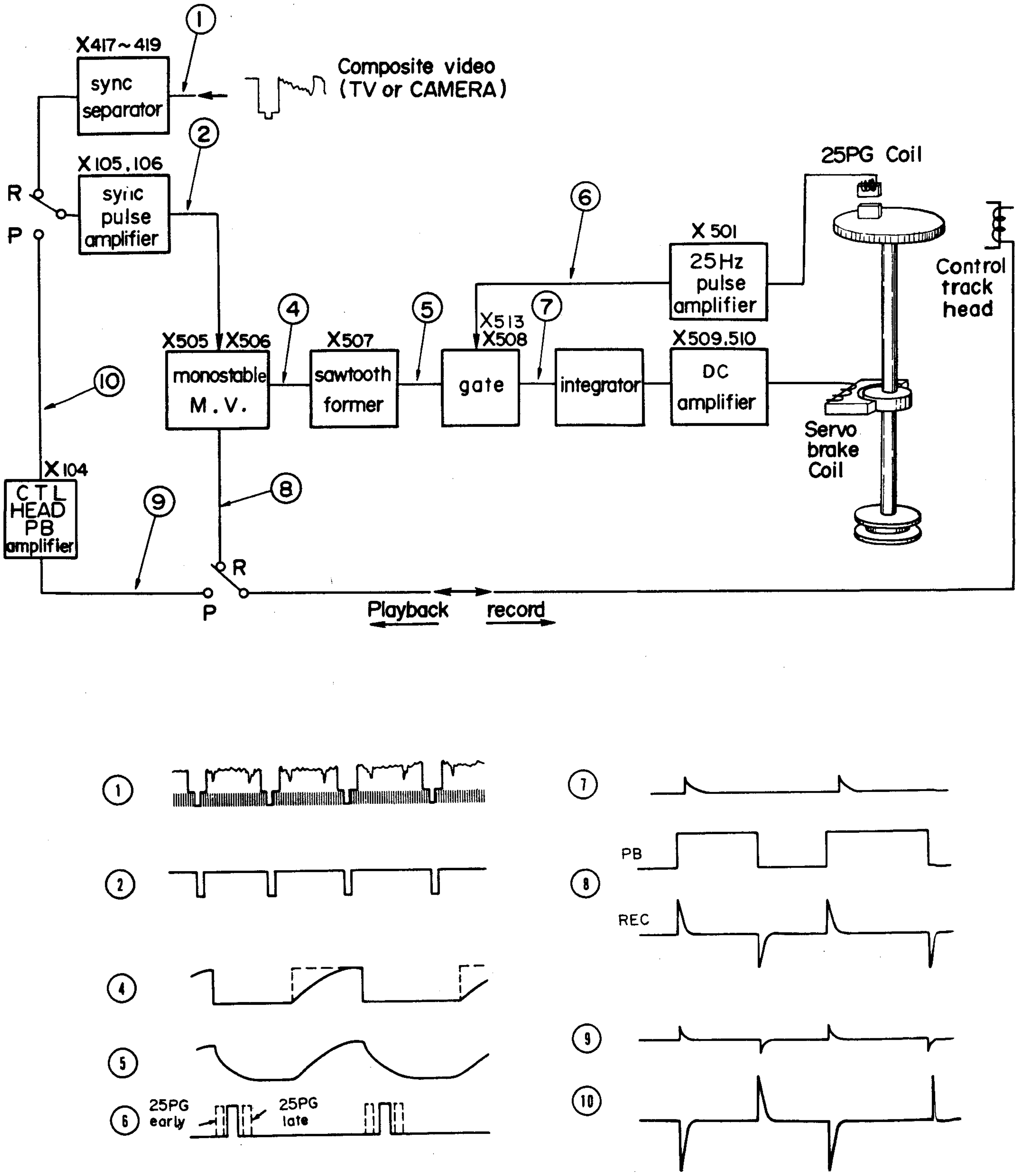

X417~419
sync separator
①
Composite video (TV or CAMERA)
②
X105,106
sync pulse amplifier
R
P
25PG Coil
⑥
X501
25Hz pulse amplifier
Control track head
④
⑤
⑦
X505
X506
monostable M.V.
X507
sawtooth former
X513
X508
gate
integrator
X509,510
DC amplifier
Servo brake Coil
⑩
X104
CTL HEAD PB amplifier
⑧
⑨
R
P
Playback
record
①
②
④
⑤
⑥
25PG early
25PG late
⑦
⑧
PB
REC
⑨
⑩

Fig. 3-1. Servo system block diagram.

Stage/Control	*Function*
	applied to the collector of X508 is sampled and appears at the emitter. Thus the output of the gate is a function of the arrival time of the 25 PG pulse. If the 25 PG pulse is early (servo too fast) the output of the gate is greater. A late 25 PG pulse (servo too slow) results in less gate output.
D-C Amplifiers X509, X510	Gate output is filtered and applied through a lag (anti-hunt) network to the d-c amplifiers X509 and X510 to supply control current to the servo brake.
Hunting Adj. R536	R536 adjusts the response time of the servo system. It is set for minimum response time without servo hunting.
Servo Brake Coil	The electromagnetic brake is similar to a squirrel-cage motor. However, in this case the rotor turns in a stationary field. Interaction between the field induced in the rotor and the static field results in braking action. The amount of braking is proportional to field current.
25 Hz PG	The 25 PG coil is mounted below the rotating-head platform. Its field is cut once per revolution by a single pole piece mounted beneath the rotating platform. This pulse is the feedback of the servo system.
25Hz Amplifier X501	X501 amplifies and shapes the 25 PG pulse that is applied to the gate circuit.
Servo Control-Track Head (CTL)	During the record mode, an output from the monostable Multi Vibrator (wave form ⑧ of Fig. 3-1) is applied to the Servo Control-Track Head. This records a 25 Hz timing reference to be used during playback.
50 Hz Amplifier X502	Pulses induced into the 50 PG coil by the two rotating pole pieces are coupled to the base of X502. This transistor is biased to amplify the pulses and reject positive-going pulses in its output. These negative spikes are fed to the Camera to synchronize the vertical deflection oscillator.

Camera Record Mode. During camera-record operations the servo system is disconnected from the brake coil and a constant current source is substituted. The 25 Hz multivibrator continues to function, however, and supplies 25 Hz pulses to the control-track head.

Stage/Control	*Function*
Brake Current R704	When TV-CAMERA selector is set to the CAMERA position, the servo system is disconnected from the brake coil and the brake coil is returned to ground through R703 and R704.
Brake Bias R708	In the camera record mode, R704 is set for a specified brake current and R708, the brake-bias control is set for a rotational speed of 25 rps.

Playback Operation. During playback, the timing reference for the servo is the 25 Hz signals that have been recorded on the control track.

Control Track Head CTL	The same head that records control pulses reads them out during playback. Since the head produces an output only when the recorded signal changes, the output is a series of positive and negative spikes that correspond to leading and trailing edge of the recorded 25-Hz square wave. See waveforms ⑨ of Fig.3-1.
CTL Sync Amplifier X104	X104 amplifies the playback control pulses. Output signal feeds through the record switch (in the playback position) to the sync pulse amp

Stage/Control	*Function*
	X105. From this point on control pulses follow the same route as separated vertical sync pulses in the TV-Record mode.

3-3. AUDIO CIRCUITS

Stage/Control	*Function*
Audio Pre-Amplifier X601, X602	Microhpone input feeds through C601 to the pre-amplifiers X601 and X602.
Audio Recording Level Adj. R701	When the AGC-MANU switch is set to the MANU position, the output of X601 is determined by the resistance of R701. This variable resistor forms a voltage divider with R606 to determine the input level of X602.
Audio AGC X605	When the AGC-MANU switch is set to AGC, the variable resistor R701 is disconnected from R606 and the collector resistance of X605 is substituted. Voltage-divider action is again implemented, but the resistance represented by X605 is controlled by audio signal level. An increase in audio level is detected by D601 and acts to make X605 conduct more heavily. This reduces the total resistance between R606 and ground and reduces signal level applied to X602. When the AUX IN jack is used, voltage divider action again forms the basis for the AGC system. In this case however, the voltage divider consists of R-631 and the collector resistance of X605.
Audio Amplifiers X603, X604	Signals from the AUX IN jack are applied to the base of X602. Then to the X603 and Audio output stage X604. The negative feedback loop from the collector of X604 to the emitter of X603 (R624, C615 and R623) shapes the characteristic of the amplifier to provide pre-emphasis for the recorded signal. X604 feeds the following four circuits during the record mode.
Audio Head	1. Audio output autotransformer T601 supplies signal through C617 to the audio head. 2. Signal from the collector of X604 is coupled through C620and R634 to the LINE OUT jack CN707 and – 3. Pins 1 and 5 (ground) of the TV jack. 4. A sample of the audio output feeds through R633 to the rectifiers (D602 and D-603) of the AUDIO LEVEL metering circuit.
Meter Sensitivity Adj. (Audio) R633	The setting of R633 determines the signal level applied to the metering circuit and is used to calibrate the meter for audio-level measurements.
Bias Trap L601, C621	The series-resonant bias trap is tuned to eliminate the high-frequency bias signal from the audio output and level metering circuits.
Playback Mode	During playback, the audio head is disconnected from the audio output stage and connected to the input of the pre-amplifier. The feed back network in the pre-amplifier is altered to take the path through R613, R614 and C607. This network alters to provide de-emphasis and equalization.
Playback Equalization Adj.	The setting of R613 determines the pre-amplifier equalization for playback.

Stage/Control	*Function*
Audio Playback Level Adj. R614	Pre-amplifier output appears across R614, which sets the drive to the output stage for playback operation. The driver and output stages, X603 and X604, function in the same way for record and playback operation.
Bias/Erase Oscillator X606, X607	The push-pull oscillator X606 and X607 supplies high-frequency current to the erase head and to the audio-record head for bias purposes. Full output is applied to the erase head. Bias current is a much smaller value and is attenuated by the padder capacitor C624. The bias oscillator operates when the RECORD button is down and the FUNCTION LEVER is in the PLAY position. The bias oscillator also operates when the FUNCTION LEVER is in the PLAY position and the EDIT button and SOUND DUB button are depressed in sequence.
Edit Function	The EDIT button sets up the machine to make a rapid change-over from the playback to the camera-record or sound dub mode. When the EDIT button is depressed, B+ is applied to the FM modulator and modulator pre-amplifier so that these circuits will be stabilized before the recordings actually begin. In addition, the mechanical latching system is released so that the RECORD or SOUND DUB button can be depressed while the machine is in the PLAY mode. Finally the B+ feed to the bias/erase oscillator is interrupted so that the bias oscillator cannot function until the RECORD or SOUND DUB buttons are depressed.
Sound Dub Mode	When the SOUND DUB button is depressed, all sections of SW601 (audio) go to the record mode but all sections of SW301 (video) remain in the playback mode. The bias and erase oscillator operates, but erase power is fed to the audio section of the erase head only. A dummy load is switched into the circuit by SW706, in place of the videoerase head to maintain a constant load in the bias and erase oscillator.

3-4. POWER SUPPLY

Stage/Control	*Function*
AC Input	Line input at CN702 is applied to the A-C input circuits through a power switch SW711 and a fuse.
Camera Voltage Supply	Power transformer T701 steps down the line voltage to supply for the camera. This low voltage is connected to CN701.
Automatic Shut Off Switch SW709	Power input for the motor is interrupted by SW709, if there is no tape in tape path during Play, Fast Forward and Rewind operations.
D-C Regulated Power Supply	Power transformer T701 steps down the line voltage and supplys to the fullwave rectifiers D506 and D507. D-C output from the rectifiers is filtered by C705 and feeded to the series regulator X701. Transistor X512 compares a sample of the output voltage, picked off at R541, with a reference voltage supplied by zener diode D508. A change in output voltage, detected by X512, results in a change in conduction of X511 and X701 that offset the origianl voltage shift.

Stage/Control	*Function*
DC Voltage Adj. R541	R541 adjusts the conduction of the series regulator to produce a standard output of +28 volts.

3-5. AC VOLTAGE SELECTION

The VTR can be set for operating on an AC power line voltage of either 100V, 110V, 220V or 240V by changing the location of the red lead wire, as shown in Fig. 3-2.

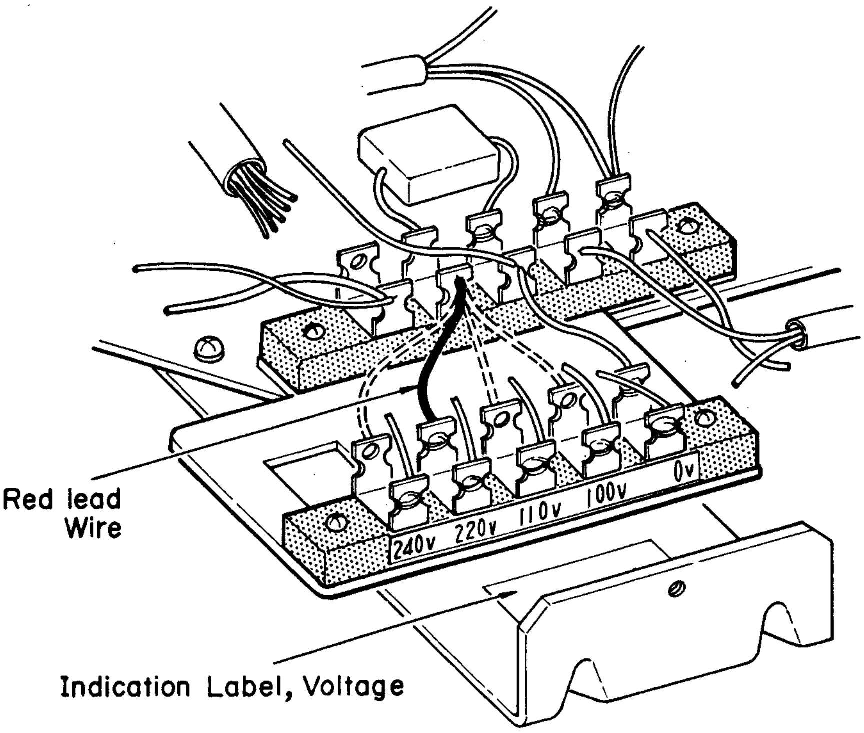

Red lead
Wire
240v
220v
110v
100v
0v
Indication Label, Voltage

Fig 3-2 AC Voltage Selection

SECTION 4

DISASSEMBLY

4-1. REMOVING THE DECK FROM THE CABINET

1. Remove the two screws (RF 5x45) at the right side of the cabinet. These screws pass through the carrying-handle assembly.

2. Stand the unit on its front side, as shown in Fig. 4-1.

3. Remove the six mounting screws (RF4x15) from the bottom of the cabinet.

4. Lifting up the frame of the deck, pull the deck out of the cabinet carefully.

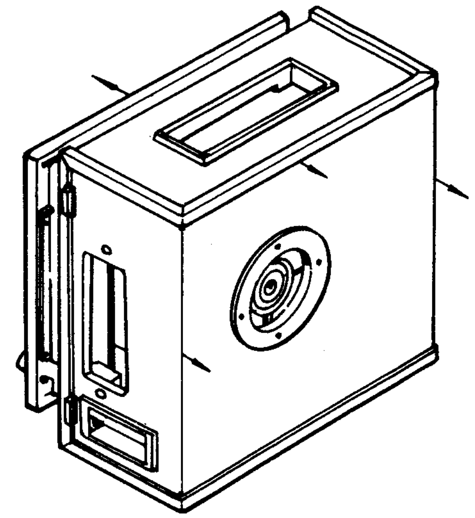


Fig. 4-1. Removing the deck from the cabinet.

4-2. REMOVING THE SIDE SHIELDS

To remove the right shield cover, remove the four screws shown in Fig. 4-2. Remove the upper plate and lift out the shield cover.

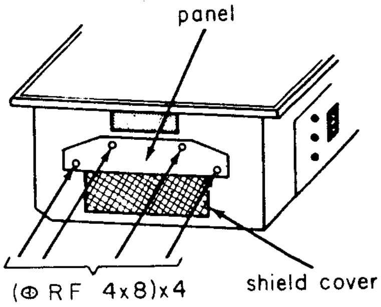


Fig. 4-2. Removing the side shield.

CAUTION

Use extreme care when operating the VTR with the shields removed. All service requiring checks or tests with the shields removed should be done by qualified service personnel.

4-3. REMOVING THE CONTROL AND REEL PANELS

1. Loosen the two screws at the back of the Head Cover. It is not necessary to remove these screws completely. Lift off the Head Cover.

2. Remove the screw at the right edge of the Function Selector Cover. Lift off the Function Selector Cover.

3. Loosen the set screw in the Function Lever (Allen wrench, 5/64" across the flats) Pull off the lever.

4. Remove the screw at the right edge of the Finger Base. Lift off the Finger Base.

5. Unhook the spring on the Fast Forward Lever where it connects to the Reel Panel. Lift off the Fast Forward Lever.

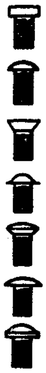
6. Remove the three mounting screws from the Control Panel. Lift off the Control Panel.

7. Loosen the two left screws located on the left side of the Reel Panel. These are captive screws; they do not come all the way out. Remove the two screws on the right side and one screw at the center of the Reel Panel. Then lift off the Reel Panel.

4-4. HARDWARE NOMENCLATURE

Screws

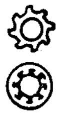
F = **Pan Head** ————————————
R = **Round Head** ———————————
K = **Flat Head** ————————————
RF = **Fillister Head** ——————————
RK = **Oval Head** ———————————
T = **Truss Head** ———————————
B = **Binding Head** ——————————
⊕ = **Phillips Head** —————————— ⊕
Set = ▯ ————————————— ⊖



W = Washer

SW = Spring Washer

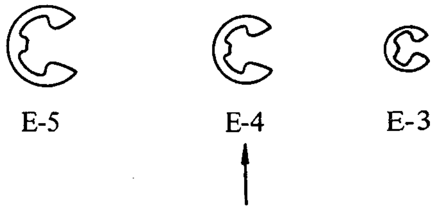
SW 4 ϕ ↖ means inside diameter in millimeter



= External Lock Washer

= Internal Lock Washer

E = Retaining Ring



size in millimeters

Screw Designations

3 x 16

Diameter of screw in mm ↗ ↖ length of screw in mm

Diameters

ϕ = Diameter in millimeters

D = diameter in inches

Inside diameter of a retaining ring must be about 1 mm smaller than outside diameter of a shaft on which the ring is to be placed. Inside diameter of a ring to be used on a 6 mm shaft, therefore, must be 5 mm.

SECTION 5

MECHANICAL MAINTENANCE

5-1. PRECAUTIONS

Machine compatibility (interchangeability of tapes between individual machines) depends upon very close mechanical tolerances in the tape path. The tape path is factory-adjusted and should not require realignment under normal circumstances. Therefore, do not attempt adjustment of the tape guides, or the taper guides. If mechanical damage requires replacement and adjustment of the guides in the tape path, return the unit to a SONY FACTORY SERVICE CENTER for repair.

5-2. CLEANING HEADS AND SLIP-RINGS

Noise in the picture during playback is usually caused by an accumulation of debris in the video heads. In some cases, half the picture may be noisy (split screen); in severe cases, video output may be lost.

To clean the heads, stop the machine, remove the tape from the tape path, and move one of the heads to the cleaning position near the left tapered guide. See Fig. 5-1.

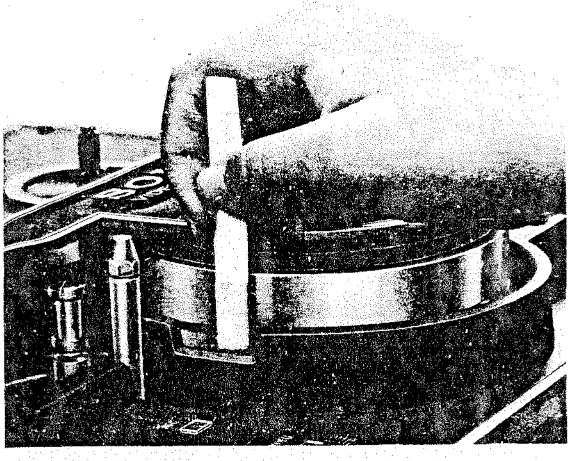


Fig. 5-1. Video head placed at the cleaning position.

CAUTION, NEVER TRY TO CLEAN THE HEADS WITH THE MOTOR RUNNING. Saturate a cleaning tip with SONY cleaning fluid or methanol. (Spray cleaner, such as M/S-brand magnetic head cleaner, gives excellent results.) Rub the cleaning tip across the head tip from side to side. Avoid vertical motion, which might damage the video-head.

Clean the erase and audio/control heads with SONY cleaning fluid, if necessary. Move the cleaning tip vertically across that part of the head surface that normally contacts the tape.

Noisy slip rings cause intermittent dark horizontal lines in the playback picture. To clean the slip rings, open the access window on the top of the rotary-head drum assembly. Remove the tape from the tape path. Apply a small amount of SONY cleaning fluid to the cleaning pad.
Place the cleaning pad into the window so that it lightly touches the slip rings.
Pull the Video Level/Standby Control to turn on the motor of the videocorder.
Clean the four pitches on the slip rings by moving the cleaning pad vertically for about 30 – 40 seconds.
Note:
Make sure that the cleaning pad does not touch the retaining part of the Rotary Video Heads.

5-3. LUBRICATION

Four major lubrication points are:

1. Supply-Reel Table Bearing.
2. Take-up Reel Table Bearing.
3. Capstan Bearing.
4. Take-up Reel (FAST FORWARD) Idler Bearing.

To lubricate the reel table bearings, remove the screw and washer at the top of the spindle. Lift the reel table slightly so that the hollow shaft of the table rises above the spindle. Apply one or two drops of SONY oil, OL-1K, to the inner surface of the reel table shaft. Seat the reel table in its proper position and replace the screw and washers.

To lubricate the Capstan Bearing, place the machine in the STOP mode. Lift the plastic washer at the base of the capstan shaft with the tip of the oil applicator. Apply a few drops of oil directly to the oil retaining washer (sponge). Be careful not to get oil on the surface of the pinch roller. Clean up excess oil.

Note, it is necessary to move the brake lever to the outside of the spindle when reseating the Supply Reel table or the Take-Up Reel table.

Note. Capstan bearing lubrication is important. Oil as directed every 300 operating hours.

To lubricate Take-Up Reel Idler, remove the reel cover and lift the metal and clear plastic washers that rest atop the idler. Apply a drop of oil to the oil retaining washer (felt) of the shaft of the idler. Wipe away excess oil and keep oil off the rubber driving surfaces.

Note, a lack of oil on this part sometimes causes a bearing noise during Play and Fast-Forward operations.

Sliding Parts. All sliding parts of the tape-transport mechanism are lubricated with a medium-heavy gray grease, which, in normal use need not be replenished. However, if new parts are installed or lubrication is obviously needed, apply a high-temperature grease at points of contact. Avoid excessive lubrication.

5-4. DRIVE-BELT REPLACEMENT

A worn or stretched video-drum drive belt results in excessive slippage and loss of servo action.

Check the belt by inspecting the inner surface. Look for cracks and streaks along the long dimension of the belt. Replace the belt if it is badly scored along its length. To check belt length, remove the belt from the machine and compare its total length (flattened) with that of a new belt from stock. Replace the belt if it is ¼-inch or more longer than a new belt.

To install the video-drum belt, stand the VTR on its left side. Loop the belt over the motor pulley, with the shiny side of the belt inside (against the pulley). Grasp the bottom of the loop and wrap around the pulley of the rotary head drum assembly.

5-5. DRIVE PULLEY ADJUSTMENTS

The lower motor pulley requires adjustment if the head-drum drive belt slips off the pulley or rides against the upper or lower shoulder of the pulley. Adjust the pulley as follows. Remove the drive belt. Loosen the set screw on the motor pulley and adjust its height by eye until it is parallel to the pulley on the rotary-head drum assembly. Reinstall the belt. (See 5-4.) Place the VTR in the normal horizontal position. Thread and play the tape. Observe the position of the belt on the pulleys. Stop the machine and readjust pulley position to make the belt run in the center of the pulleys.

Check final pulley position by starting and stopping the tape several times. Rewind the tape and try the fast-forward mode a few times. Make sure that the belt does not drift towards the edge of the pulley or slip off when changing speeds.

5-6. VIDEO HEAD REPLACEMENT

Video Head Replacement is necessary when either head is damaged or has an open coil. In addition, insufficient tape penetration, resulting from head wear after long periods of operation may necessitate replacement. See Section 6-4 for video-head output checks. To remove and replace the rotary head assembly (the disk on which the two video heads and the slip-rings are mounted), proceed as follows.

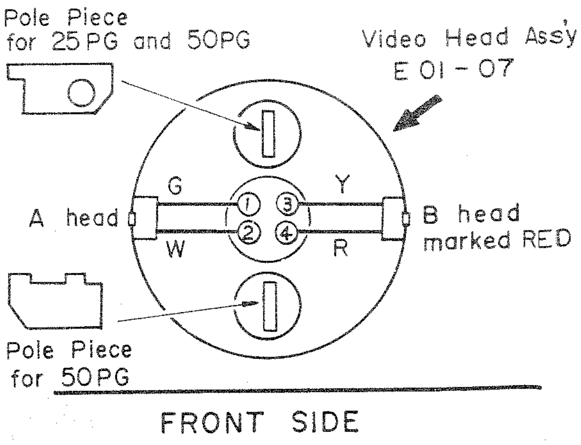


Fig. 5-2. Video Head Ass'y Mounting Position

CAUTION

The video head assembly and the surrounding machined parts are very precisely made. Use utmost care when performing any work on the rotary head-drum assembly.

Removal

1. Turn off the Power. Loosen the two screws that hold the Black head-drum cover. A coin will serve as a screwdriver for these screws. Loosen only half a turn; do not try to back the screws all the way out. Lift off the head-drum cover.

2. Remove the three Phillips-head (Pan head) screws that hold down the cover plate.

3. Loosen the brush pressure adjusting screws and separate the brush from the slipring as shown by the arrows in Fig. 5-3.

4. Remove the two upper Hexagon Socket Head Bolts 5x20, Washers and Spring Washers with 4mm Allen wrench.

Note. Loosen the Hexagon-Head Socket Head screws slightly. Hold the upper drum with one hand so that it does not fall as you withdraw the two screws.

5. Carefully lift the top of the drum assembly and fold it back using the brush cables as a "hinge." Place the drum top carefully on the reel panel. See Fig. 5-4.

6. Rotate the video head assembly so that the B head is at the 3 o'clock position. (The B head can be identified by the red paint* on the outer edge of the aluminum head-mounting disk.) At that position, the 25 PG pole piece is positioned over the 25 PG coil. Use the 25 PG pole-piece and coil as a position reference. See Fig. 5-5. This will prevent you from interchanging the positions of the A and B heads when the new head is installed.

CAUTION

Never handle the 50 PG pole pieces.

* Paint colors other than red may be found.

For positioning the rotary head disk, prevent to touch the video heads, slip rings and pole pieces.

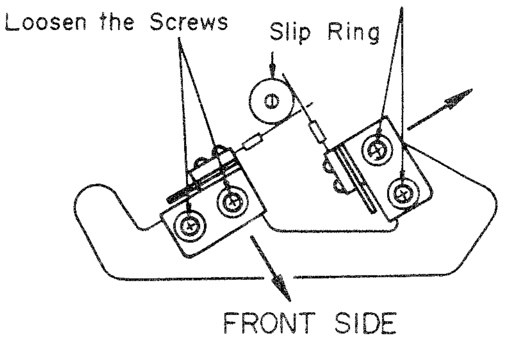


Fig. 5-3. Preparation for Video Head Replacement

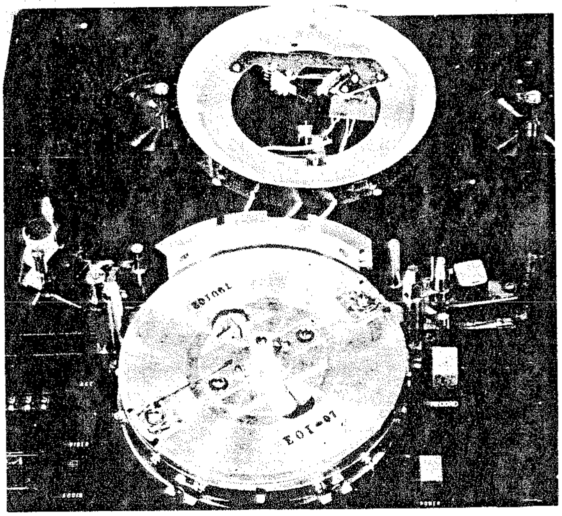


Fig. 5-4. Top of Rotary Head Drum assembly folded back to expose VideoHead assembly.

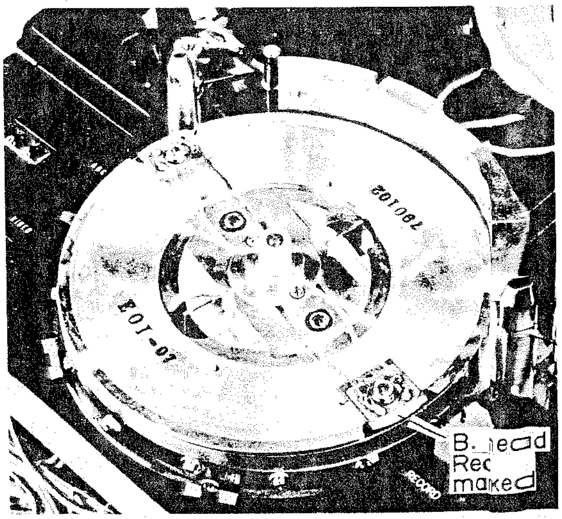


Fig. 5-5. Position the head assembly with the B head (red) at the 3'clock position. Use this position as a reference when replacing the Video Head assembly.

7. Hold the Video Head assembly to keep it platform from rotating, and loosen the two RF 4x10 screws that hold the head assembly to the platform. Do not exert too much downward pressure on these screws; loosen the locking compound with Methyl-Ethyl Ketone. Remove the screws and the washers.

8. Using both hands, carefully lift the Video Head assembly off the platform.

Replacement

9. Clean the bottom of the new Video Head assembly. Do not scratch or remove the spacer on the bottom of the Video Head assembly.

10. Position the platform so that the 25 PG pole piece is above the 25 PG coil.

11. Carefully place the Video Head assembly on the platform with the B head to your right (3 o'clock position). The head assembly should fit down snug against the platform without the use of force.

12. Install the two RF 4x10 screws and washers. Rotate the head assembly gently to the left and right until it is approximately in the center of the angular "play" permitted by the mounting screws. Tighten the screws alternately, applying torque gradually until the screws are tight.

13. Support the top with one hand while inserting the two Hexagon - Socket Head Bolts and Spring Washers.

14. Grasp the top of the Rotary Head Drum Assembly and push it back and down against the locating plate.

15. Tighten the two bolts alternately, applying torque gradually until all are tight.

16. Tighten the brush pressure adjusting screw to obtain a 2 mm bend (approximately) as shown in Fig. 5 - 6 .

17. Inspect the brush and slip-ring assembly to make sure that the brushes contact with the slip rings perfectly. Check the slip-rings for eccentricity, as directed in Section 5-7.

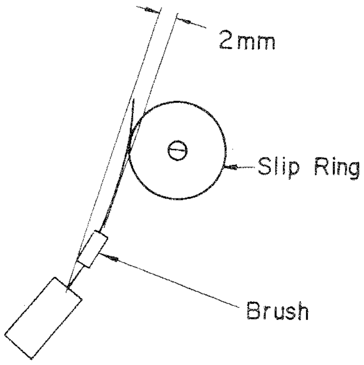


Fig. 5-6. Brush Pressure Adjustment.

5-7. SLIP-RING ADJUSTMENT

1. Check the slip-ring assembly by rotating the video-head assembly by hand. Check eccentricity (lateral wobble). Observe the brushes and see if they remain in the center of the slip rings.

2. Loosen the two screws that secure the slip-ring assembly to the video-head assembly. Position the slip-ring assembly to correct eccentricity.

3. Tighten the mounting screws when rotation of the video head assembly shows the slip rings to be concentric with the shaft (no lateral wobble).

5. Position the brush assembly by hand to make the brushes contact with the sliprings respectively.

5-8. BRUSH-PRESSURE ADJUSTMENT

1. Brush pressure should be checked when replacing the brushes or the video-head assembly, or if the brushes appear to introduce noise into the picture.

2. Adjust brush pressure by bending the brush 2mm (approx.) as illustrated in Fig. 5-6.

5-9. SLIP-RING ASSEMBLY REPLACEMENT

1. Remove the cover of the upper rotary head-drum assembly.

2. Remove the four screws that hold down the two brush assemblies. Shift the brush

assembly toward the outside of the slip rings and fold it back out of the way.

3. Unsolder the four slip-ring leads at the terminals near the video heads.

4. Remove the two screws and washers that hold down the slip-ring assembly to the video-head assembly.
   Lift out the slip ring assembly.

5. Install the new slip-ring assembly so that the red wire comes out at the B-head side of the video-head assembly. (The B head is identified by the red paint on the outer edge of the aluminum disk.) Install the screws and washers that secure the slip ring assembly to the video-head assembly. Do not tighten the screws.

6. Connect the slip-ring leads to the video-head terminals as shown in Fig. 5-7.

7. Rotate the video head assembly to make sure that the slip rings are concentric with the rotary-head shaft. Center the assembly and tighten the mounting screws.

8. Re-install the brush assembly and check brush pressure. See Section 5-8.

9. Install the cover on the rotary head-drum assembly.

10. Apply a small amount of SONY cleaning fluid to the fluid to the cleaning pad and clean the four sliprings with the motor running.

11. Stop the motor and wipe the outer edge of the drum assembly.

5-10. TAPE TENSION BRAKE AND DAMPER SPRING ADJUSTMENT

This adjustment corrects the back tension applied by the Tension-Brake Servo to the Supply Reel.

1. Place a full reel of tape on the supply-reel table.

2. Make a loop in the tape and attach the spring scale as shown in Fig. 5-8.

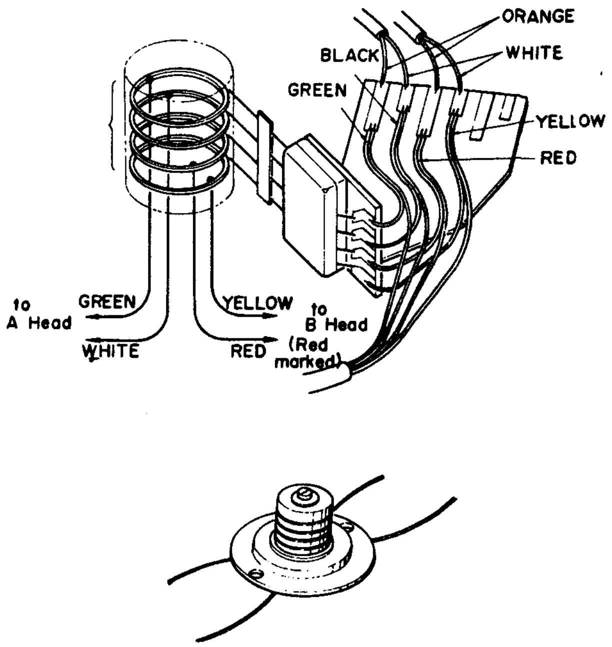


Fig. 5-7. Brush and Slip-ring Ass'y.

3. Pull the scale in the direction indicated–a steady pull, at approximately the correct speed, should give a reading of 40~65 grams. If it does not, proceed as follows.

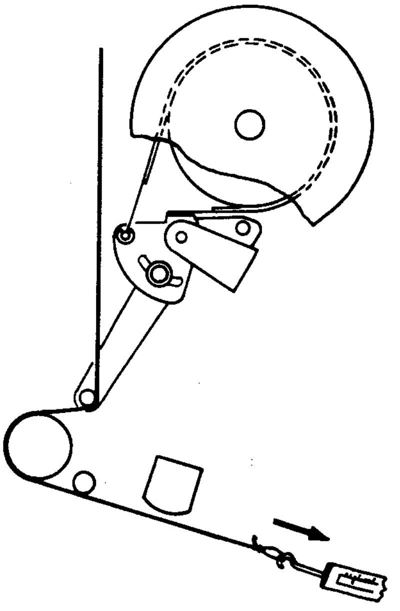


Fig. 5-8. Measuring tape tension at the Supply Reel.

4. If the reading is less than 40 grams of tension, clean the chamois surface of the brake shoe. If this does not remedy the condition, loosen a 3mm dia screw that fasten the tension brake spring stay.

5. If it takes more than 65 grams of tension to move the Supply Reel, reduce tension-brake pressure by adjusting the same 3mm dia screw.

6. Repeat the tension check using a Supply Reel with a few turns of tape on it.

7. Check to see that the check and adjustment are made with the skew control set in neutral position.

8. Check to see that the back tension increses as the skew control knob is turned clock wise.

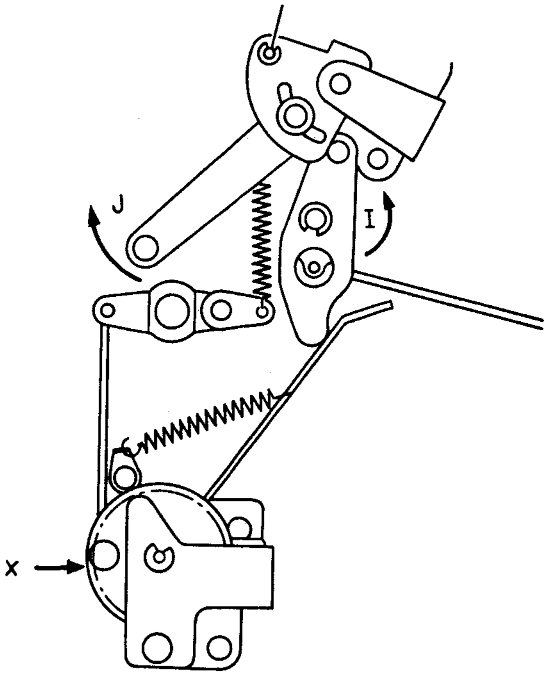


Fig. 5-9. Skew control.

5-11. REEL TABLE HEIGHT

1. Run a Tape in the PLAY mode.

2. Check both reels to see that tape does not rub against the edges of the reels.

3. If the tape is not centered in either reel, adjust reel height by adding or removing the fiber washers (Thrust Bearers part number 3-601-037-01) beneath the reel-table assembly.

5-12. AUDIO/CONTROL HEAD REPLACEMENT

A malfunctioning Audio/Control head can be replaced without disturbing servo tracking by following this procedure.

1. Unsolder the connecting leads at the rear of the Audio/Control head.

2. Remove the screws labeled A and B in Fig. 5-10a. Be careful not to lose the spring on the left screw (A). Do not loosen the screws in the long slots.

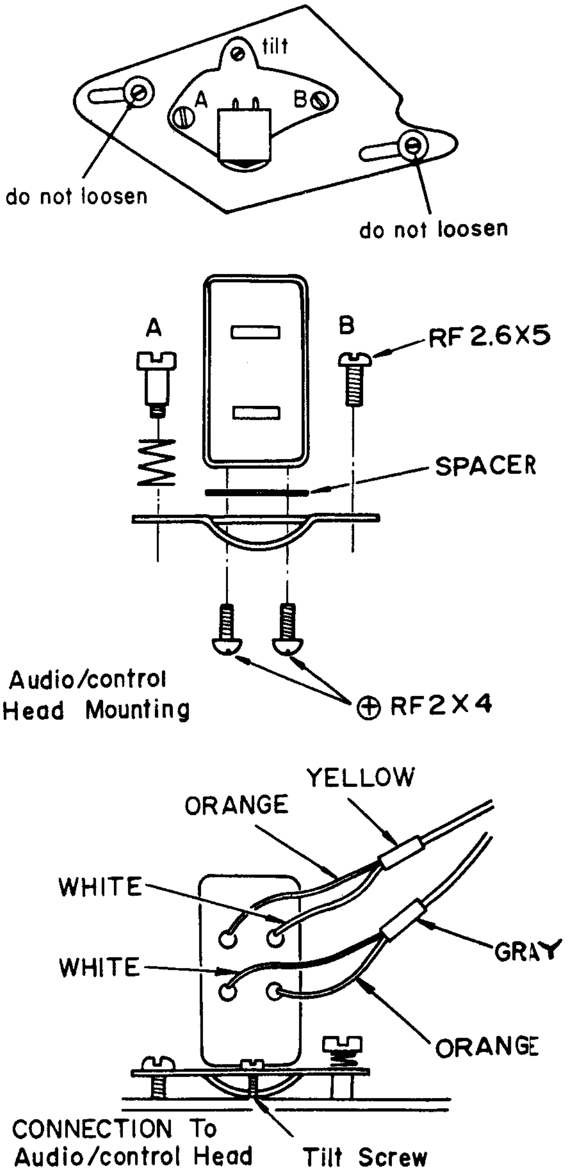

tilt
A
B
do not loosen
do not loosen
A
B
RF 2.6X5
SPACER
Audio/control
Head Mounting
⊕ RF2X4
YELLOW
ORANGE
WHITE
WHITE
GRAY
ORANGE
CONNECTION To
Audio/control Head
Tilt Screw

Fig. 5-10. Audio/control head height adjustment.

3. Lift the head assembly off the mounting plate.

4. Turn the head upside down and remove the two screws (⊕ RF 2x4) that hold the head assembly to the mounting plate.

5. Place the new head assembly on the mounting plate and install the two screws from the bottom.

6. Install the head/mounting plate assembly using the screws labeled A and B in Fig. 5-10a. The spring on screw A goes between the head of the screw and the top of the mounting plate. Turn the screw A until tight. Adjust screw B (Azimuth adjust) as follows.

7. Playback the SONY Audio Standard Tape. Set the METER SELECT switch to AUDIO. Adjust the azimuth screw (Screw B in Fig. 5-10a) for maximum indication on the meter (maximum output at 10 KHz).

8. Stop the tape and remove the shield plate in front of the Audio/Control Head.

9. Play the tape and check to see that the core of the head extends an equal amount above and below the edges of the tape. See Fig. 8-3b in Section 8-3. Adjust the tilt screw at the rear of the mounting assembly, if necessary, until the above-mentioned condition is reached.

10. Recheck the azimuth adjustment.

11. Check audio bias voltage. See Section 8-2.

5-13. TAKE-UP IDLER ADJUSTMENT

Inspect the take-up idler if the machine is noisy during Play of Fast-Forward operations, if the Take-up reel does not wind up tape fast enough during Play operation, or if tape does not move rapidly in the Fast-Forward mode of operation.

1. Place the Function Lever in the STOP position. Inspect the Take-up Idler to make sure it is disengaged from the upper motor shaft and the lower (black) half of the Take-up Reel Assembly. Inspect the drive surface of the idler for roughness. Clean any oil or debris from the drive surfaces of the Take-up Reel Assembly.

2. Place the Function Lever in the PLAY position. Check to see that the Take-up Idler is engaged. with the upper motor shaft and the lower half (black) of the Take-up Reel Assembly. The Take-up Idler should not touch the upper (red) part of the Take-up Reel Assembly. Return the Function Lever to STOP.

3. Place a strip of cardboard between the right tapered guide and the right tape guide to disable the automatic shut-off switch.

4. Set Function Lever to PLAY. The Take-up Reel Assembly should turn smoothly.

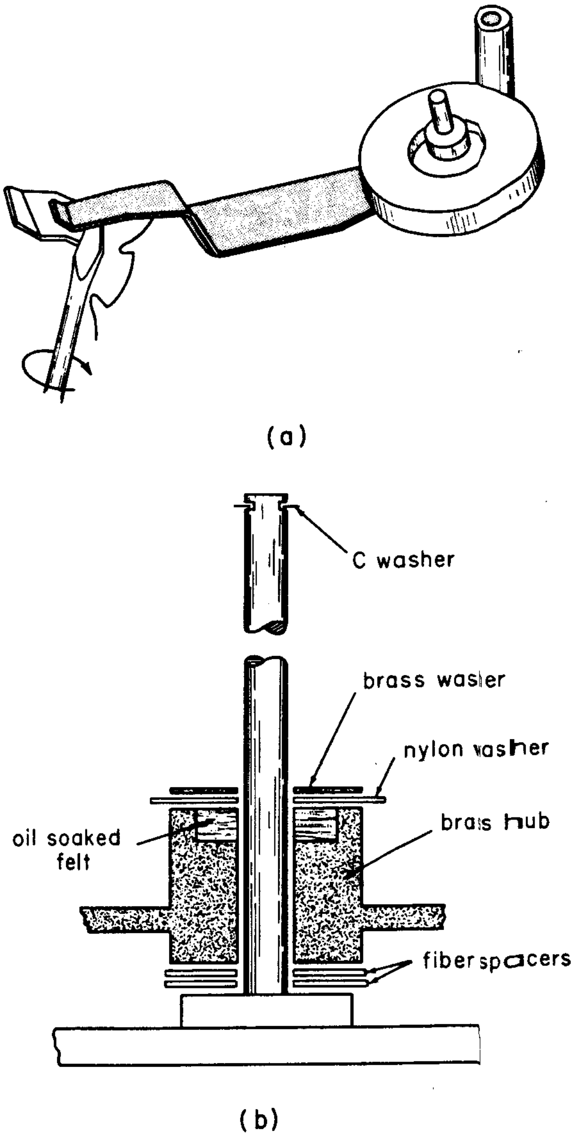


Fig. 5-11.
(a) Testing the Take-Up Idler for Fast-Forward action;
(b) Cross section of the Fast-Forward Idler Assembly.

5. Turn the FAST-FORWARD Lever to the left and release it. The Take-up Idler should run up on the upper (red) part of the Take-up Reel Assembly to drive this assembly directly. Check for noise and smooth operation.

6. Set the Function Lever to STOP. The Take-up Idler should disengage and drop to its former position.

7. If the Take-up Idler does not "run up" during fast-forward operation, repeat Step 4 and tilt the "tail" of the Idler Plate assembly using a screwdriver as shown in Fig. 5-11a. If you can start the fast-forward mode this way, check the point of contact between the Fast-Forward cam and the tail of the Idler Plate Assembly. Bend the tail of the asembly downwards if necessary. Do not bend the Fast-Forward Cam.

8. To replace a worn Take-up Idler, pry the C washer from the top of the shaft with a screwdriver. Do not pull with pliers or you might bend the shaft or the Idler Plate Assembly. Pull off the idler. Before installing a new idler, apply a few drops of oil to the shaft of the Idler Plate Assembly. Install the idler as shown in Fig. 5-11b. Apply a drop of oil to the oil-retainer felt ring.

9. Set the Function Lever to PLAY and check to make sure that the idler does not bear against the upper (red) part of the Take-up Reel Assembly. Adjust idler height by adding or removing the fiber washers beneath the idler.

5-14. REWIND IDLER REPLACEMENT

1. Check the Rewind Idlers if the machine is noisy during rewind operations, if the machine does not wind up tape smoothly and rapidly during rewind operations, or if the Supply Reel is not braked properly when going from PLAY to STOP.

2. Inspect the driving surfaces of both rewind idlers for excessive or uneven wear. Inspect the driving surface of the Supply Reel Assembly. Clean away any oil or debris from all driving surfaces.

3. Set the Function Lever to PLAY. Check to see that the Left Rewind Idler is disengaged from the Supply Reel Assembly and that the Right Rewind Idler is not engaged with the upper motor shaft (knurled member).

4. Set the Function Lever to STOP. Check to see that the Left Rewind Idler bears against the Supply Reel Assembly, and the Right Rewind Idler is disengaged from the upper motor shaft.

5. Set the Function Lever to REWIND. This should couple the upper motor shaft to the Right Rewind Idler, and the Supply Reel Assembly to the Left Rewind Idler. Turn the capstan shaft by hand to see that the Supply Reel Assembly is driven Smoothly, and that the Rewind Idlers do not rub against the push rod. Check to see that the directional brake is facing in the correct direction (See Fig. 5-12) and that the brake does not offer resistance to the Left Rewind Idler.

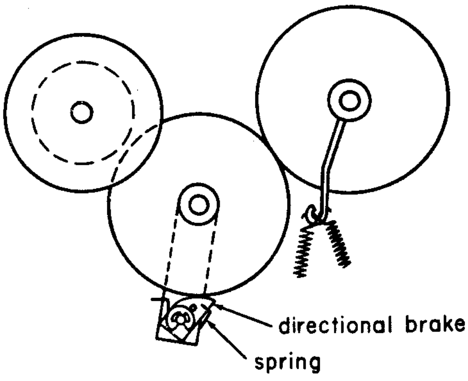


Fig. 5-12. Proper position of the directional brake on the Left Rewind Idler.

To replace the Rewind Idlers proceed as follows.

6. Remove the Take-Up Reel Assembly.

7. Pry the C washer from the top of the Right Rewind Idler's shaft using a screwdriver. Remove the fiber washer and the push rod. Pull the Right Rewind Idler off it its shaft. Inspect the idler to identify top and bottom so that the replacement will be installed right side up.

8. Pry the C washer from the top of the Left Rewind Idler. Pull off the fiber washer

and lift off the Idler. Note, the directional brake will spin counterclockwise when the idler is removed.

9. To replace the Left Rewind Idler, first place one drop of oil on the idler shaft. Next, rotate the directional brake clockwise until the tip faces to the right (3 o'clock). Position the idler shaft so that the idler can be dropped on the shaft. Release the directional brake. Install the fiber washer and the C ring.

10. Place a drop of oil on the shaft of the Right Rewind Idler. Install the Right Rewind Idler, the fiber washer, the push rod and the C ring in that order.

5-15. BRAKE-SYSTEM CHECKS

System braking requires attention if:

a. the Supply Reel exerts too much back tension during PLAY and FAST FORWARD operations.

b. the Supply Reel pays out and slackens tape when going from PLAY or FAST FORWARD to STOP.

c. the Take-up Reel exerts too much back tension during REWIND operations.

d. the Take-up Reel pays out too much tape when going from REWIND to STOP.

Check the brake system as follows.

1. Place the Function Lever in the STOP position.

2. Check the directional characteristics of both reel assemblies. The Supply Reel Table should turn freely in the clockwise direction, but should encounter maximum resistance when turned in the counterclockwise direction.

3. Check the directional brake on the Left Rewind Idler. It should "dig-in" to the Left Rewind Idler when the Supply Reel Assembly is turned counterclockwise.

4. Check the driving surface of the Left Rewind Idler and the lower (dull) part of the Supply Reel Table. Clean away oil or debris on these driving surfaces.

5. Check the contact between the Left Rewind Idler and Supply Reel Table. If they are not in contact with the Function Lever at STOP, check the Right Rewind Idler, the Push-Rod-For-Rewind-Idler, and the Function Cam. Idler diameters may be insufficient due to wear or the push rod may be bent.

6. Check the directional characteristics of the Take-up Reel Table. It should turn counterclockwise with little resistance, but should exhibit increased resistance when turned in the clockwise direction. If it does not, proceed as follows.

7. Inspect the Take-up Reel Assembly for oil or debris. Clean if necessary. Check the chamois brake shoe for excessive wear. Replace the Brake Lever Assembly if the chamois is worn. Do not attempt to restore or clean the brake surface of the shoe.

8. Check to see that the brake shoe is in contact with the Take-up Reel Assembly. The lower end of the Brake Lever should not be in contact with the Function Cam and the brake shoe should be held against the surface of the Take-up Reel Table by spring tension alone. See Fig. 5-13. If the lower end of the Brake Lever touches the Function Cam, remove the brake lever and bend the tab as shown in Fig. 5-13.

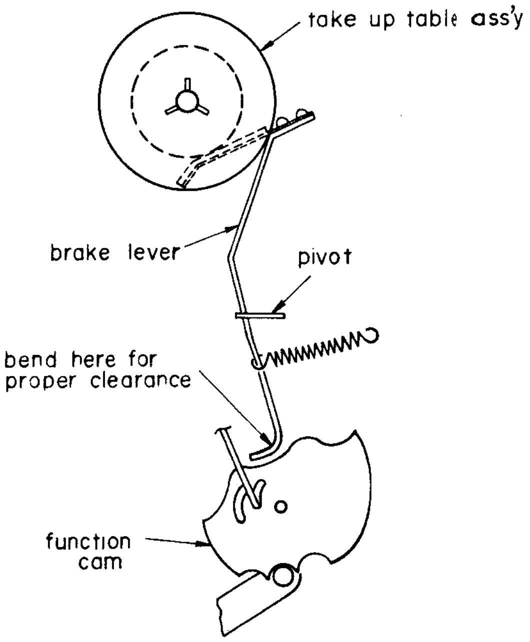


Fig. 5-13. Adjustment of the Take-Up Reel brake.

9. Replace the Brake Lever, and set the Function Lever to PLAY. Check to see if the Brake shoe is clear of the Take-up Reel Assembly. There should be about 1/16" between the shoe and the surface of the top (red) part of the Take-up Reel Table. If not, reset the end of the Brake Lever.

10. Set the Function Lever to STOP and recheck to see that the shoe of the Brake Lever bears against the Take-up Reel Table.

5-16. MOTOR REPLACEMENT

If a defective motor is suspected, check the mechanical load on the motor to make sure that the capstan and rotary-head drum assembly turn freely. Check for line voltage between the black and white leads of the motor with the STANDBY KNOB switch pulled out. In addition, check phasing the capacitors, C702 and 703 in series with the green lead of the motor. If the line voltage is present, the phasing circuit is correct, but the motor does not turn, replace the motor as follows.

1. Stand the machine on its left side.

2. Cut the white and black motor leads at the terminal strip. Cut the green motor lead at the terminal of the phasing capacitor C702. Leave 1/8" of insulation on the stubs of the leads remaining on the terminal strip and the phasing capacitor. The colored insulation will aid in locating the correct tie points for the new motor.

3. Remove the drive belt for the Rotary Head-Drum Assembly.

4. Inspect the lower drive pulley on the motor shaft and note the position of the fan on the shaft. The drive pulley should be set with 0.8mm clearance between bottom of the motor and top of the drive pulley. Make a note of the position for future reference.

5. Loosen the Allen-type set screw in the lower drive pulley. To gain access to the set screw, rotate the pulley until the set screw is at about the 8 o'clock position. Insert the Allen wrench from this position. Pull off the drive pulley and fan.

   NOTE. Do not remove the gray plastic fan from the lower drive pulley.

6. Loosen a Phillips head screw that secure the motor to the Lower motor bracket.

7. Remove the Take-up Reel assembly, the Right Rewind Idler, and Take-up Idler. Remove the Right Rewind Idler holding bracket.

8. Hold the motor with one hand and back out the four Phillips-head screws from the top of the chassis. See Fig. 5-14. Do not lose the lock nuts or the spacers.

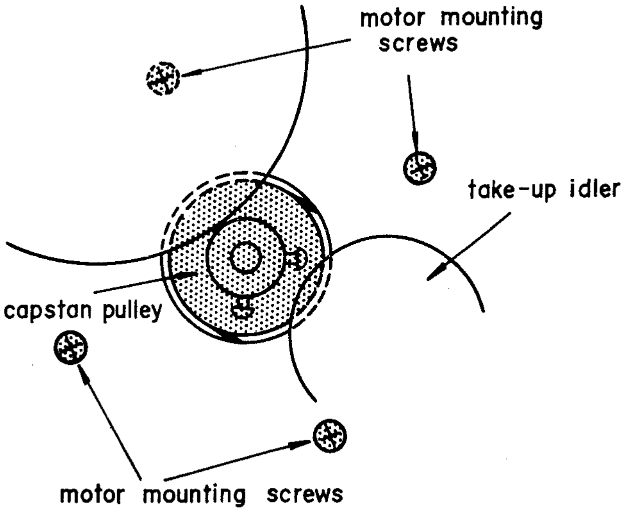


Fig. 5-14. Location of the four motor-mounting screws.

9. Rock the motor as necessary to clear the lower mounting bracket, and pull out the motor.

10. Take the upper, knurled pulley from the top of the motor shaft.

11. Note the position of the hum belt (the steel band that surrounds the motor). Loosen the two screws that apply tension to the hum belt and remove the belt.

12. Install the hum belt on the new motor. Position the mounting screws as shown in Fig. 5-15. Make sure that the hum belt straddles the two end bells equally.

13. Install the top (knurled) drive pulley on the upper motor shaft. Space the bottom edge of the pulley about 1.5mm from the top of the motor. See Fig. 5-16.

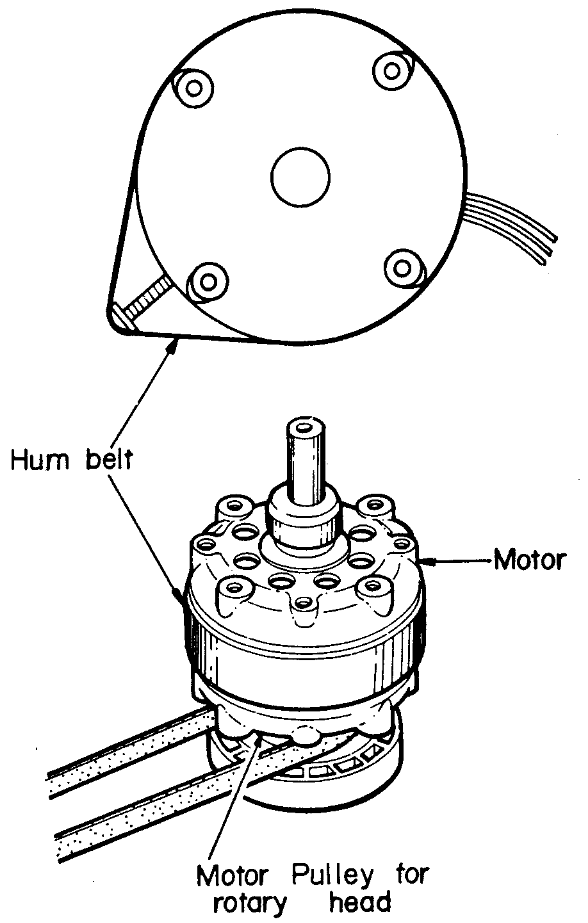


Fig. 5-15. Installation of the motor's hum belt.

14. Put a lock washer on one of the motor-mount screws and insert the screw through a mounting hole at the top of the chassis. Slide one of the spacers on to the screw from beneath the chassis.

15. Put the motor in place beneath the chassis with the leads coming out towards the bracket. Make sure that the upper pulley is inside the loop of the capstan drive belt. Thread the screw installed in Step 14 into the motor end bell.

16. Install the screw in the lower bracket (into the lower end bell).

17. Install the three remaining screws and spacers between the chassis and the motor. Remember to install a lockwasher under the screw head in each case. Tighten all screws and apply lock paint on it.

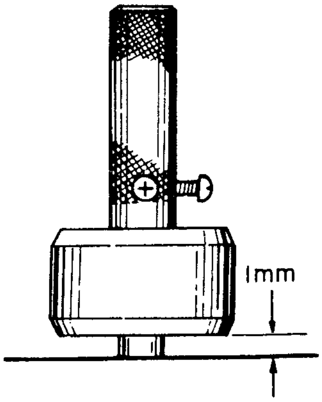


Fig. 5-16. Installation of the upper motor pulley.

18. Check the capstan drive belt to make sure it is placed properly on the Capstan Flywheel.

19. Install the lower drive pulley. Refer to Step 4 for the proper position.

20. Slide the plastic sleeve over the motor leads. Pass the motor leads through the opening between the bracket and the chassis. Solder the motor leads to the following tie points of the 5P lug:

    Motor leads connections

    black–terminal 1 of the terminal strip

    white–terminal 2 of the terminal strip

    green–common lug of C703

21. Install the Rotary Head Drum Assembly drive belt. See Section 5-4.

22. Operate the motor and check the PLAY, FAST-FORWARD and REWIND operations. Check the running position of the lower drive belt as directed in Section 5-4.

5-17. RECORD-BUTTON LATCH LINKAGE

A faulty Record-button locking system is indicated when:

1. The Record or Sound Dub. Button do not latch and cannot be fully depressed (VTR in stop mode.)

2. The Record or Sound Dub. Button can be depressed fully but do not latch in the "down" position.

3. The latched Record or Sound Dub. Button remain latched in the record position when the Function Lever is moved from PLAY to STOP.

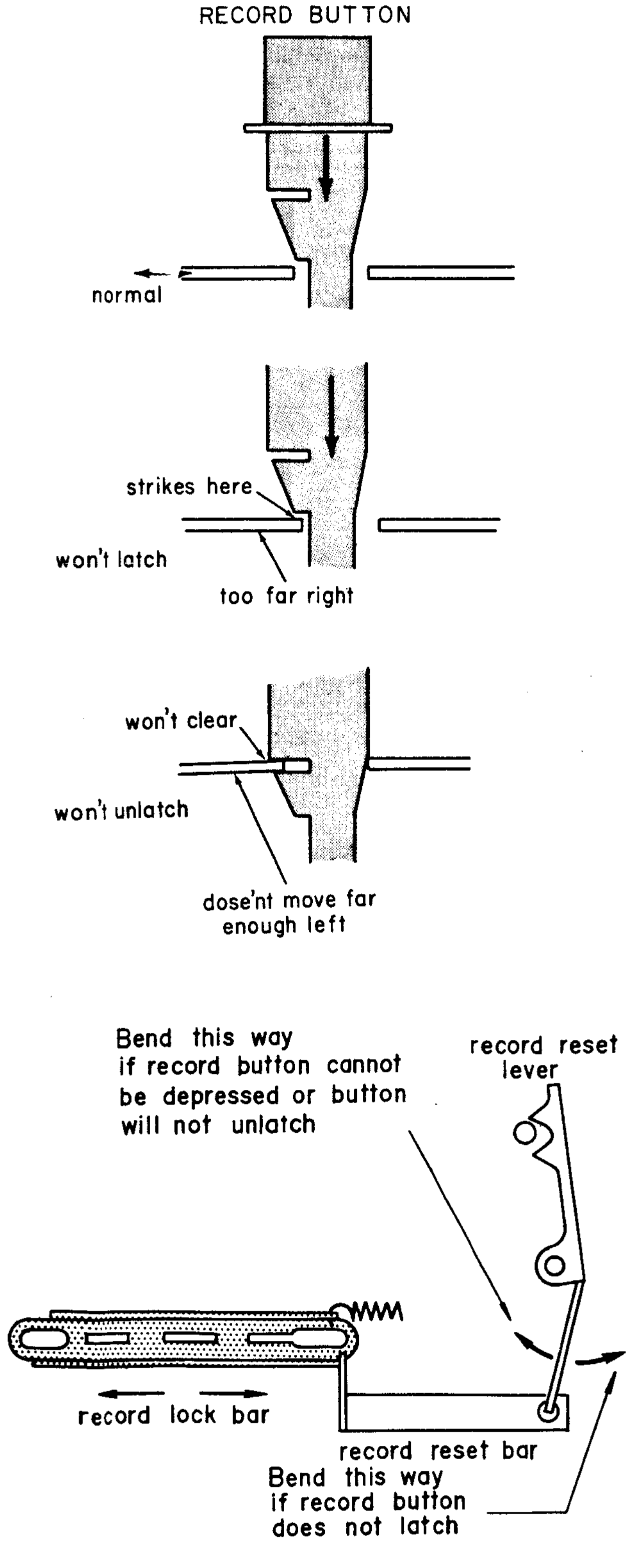

RECORD BUTTON
normal
strikes here
won't latch
too far right
won't clear
won't unlatch
dose'nt move far enough left
Bend this way if record button cannot be depressed or button will not unlatch
record reset lever
record lock bar
record reset bar
Bend this way if record button does not latch

Fig. 5-17. RECORD button latching mechanism and adjustment.

4. The latched Edit Button remains latched in Edit position when the Function Lever is moved from PLAY to STOP.

Operation of the latch linkage is shown in simplified form in Fig. 5-17. Faulty latching results from incorrect position of the REC lock bar.

To correct condition 1 (cannot be depressed), bend the lower part of the REC Reset Lever to the left. To correct condition 2 (failure to latch), bend the lower part of the REC Reset Lever to the right. To correct condition 3 and 4 (failure to unlatch) bend the lower part of the REC Reset Lever to the left.

5-18. AUTOMATIC SHUT-OFF SWITCH

Replacement and Adjustment

To check the operation of the Automatic Shut-Off switch, remove tape from the normal tape path and set the Function Lever to PLAY. The motor should shut down; the Rotary head ass'y should stop its rotation. Repeat this check with tape threaded properly. The machine should then remain on when the Function Lever is set to PLAY.

If the above-mentioned conditions are not met, inspect the sensing wire of the Automatic

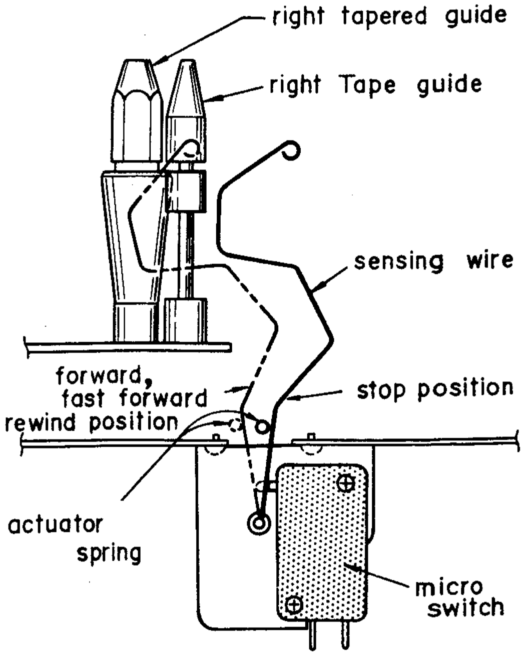

right tapered guide
right Tape guide
sensing wire
forward, fast forward rewind position
stop position
actuator spring
micro switch

Fig. 5-18. Action of the Automatic Shut-Off switch.

Shut Off Switch. It should fall into the tape path (between the Right Tapered Guide and the Right Tape Guide, when the Function Lever is set to PLAY or REWIND, and should retract when the Function Lever is set to Stop.

See Fig. 5-18. If the Sensing Wire does not move freely, check to see that there are no obstructions to the normal movement of the wire. If the wire is badly bent, it is necessary to replace the entire assembly. This includes the wire, the damping system, and the small bracket on which they are mounted.

To adjust the penetration of the sensing wire into the tape path, loosen the two Phillips-head screws that fasten the mounting bracket to the underside of the chassis. Slide the bracket towards the rear of the machine to increase the penetration of the sensing wire into the tape path.

To replace a defective microswitch, proceed as follows.

1. Unsolder the leads from the microswitch terminals.
2. Make a note of the micro switch mounting bracket position for the future reference.
3. Remove Function Lever Cover and Lever. Remove Reel and Control Panels.
4. Hold the lockplate from upper side of the chassis with your finger, and remove the two phillips-head screws that fasten the mounting bracket to the underside of the chassis.
5. The mounting screws for the microswitch are now accessible.
6. Remove two screws and replace the microswitch.
7. Put the microswitch mounting bracket. Refer to Step 2 for the proper position.
8. Solder the leads to the new microswitch.
9. Replace the Reel Panel.
10. Solder the leads to the new microswitch.

5-19 CAPSTAN BEARING AND SHAFT REPLACEMENT

A worn Capstan Bearing results in noisy operation (a squeaking sound from the capstan). When it becomes necessary to replace the Capstan Bearing, the Capstan Shaft must be replaced as well.

Proceed as follows.

1. Remove Reel and Control Panels.
2. Stand the machine on its left side.
3. Take the drive belt off the Capstan Flywheel.
4. Loosen the Allen-type set screw on the hub of the Capstan Flywheel.
5. Hold the flywheel with one hand and pull the Capstan Shaft up through the Capstan Bearing. Remove the flywheel; do not lose the fiber washer that goes between the Capstan Flywheel and the Capstan Bearing. Place the machine in the normal position.
6. Remove the three screws (two ⊕ RF 4x6, one ⊕ RF 3x6) that fasten the Audio/Control Head assembly to the chassis and the top of the Capstan Bearing. See Fig. 5-19. Lift off the Audio/Control Head assembly and place it to one side.

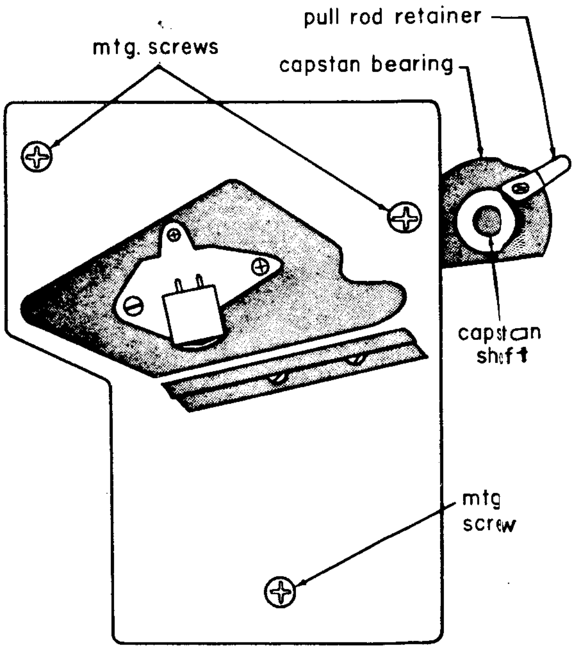


Fig. 5-19. Capstan-bearing removal

7. Remove the screw that fastens the Pull-Rod Retainer to the top of the Capstan Bearing. Remove the Pull-Rod Retainer.

8. Remove the Oil Retaining Ring and the Oil Ring (sponge) from the top of the Capstan Bearing.

9. Stand the machine on its left side and remove the three screws that fasten the Capstan Bearing to the chassis. Remove the Capstan Bearing.

10. Before installing the new Capstan Bearing, inspect the replacement. Pass a clean lint-free cloth through the capstan hole, and inspect the inner surfaces for dirt or foreign matter.

11. Install the Capstan Bearing. Stand the machine on its left side, and install the three lower screws. Stand the machine upright. Put the Audio/Control Head assembly into place and install the screws that fasten the Audio/Control Head assembly to the chassis and the top of the Capstan Bearing. Install the Pull-Rod Retainer and its mounting screw. Apply Lock Paint to all screws.

12. Inspect the new Capstan Shaft. Handle this piece carefully to avoid scratches or nicks on the bearing surface. Slip the Oil Retaining Ring and Oil Ring onto the shaft. Place a few drops of oil on the inner surface of the bearing. Insert the shaft into the Capstan Bearing.

13. Stand the machine on its side and install the Capstan Flywheel. Tighten the flywheel set screws. Check the vertical play in the Capstan Shaft. It should move perceptibly when you pull up the capstan. Reset the flywheel, if necessary to obtain this vertical play. Tighten the flywheel set screws securely.

14. Reinstall the capstan drive belt.

15. Operate the machine. Check servo tracking and Audio/Control Head adjustment. See Section 5-12.

5-20. PINCH ROLLER REPLACEMENT

Replace a worn or damaged Pinch Roller as follows.

1. Place the VTR in the STOP mode.

2. Remove the Pinch Roller Retainer and its mounting screw from the top of the Pinch Roller.

3. Pull off the Pinch Roller.

4. Remove the ball bearings from the top and bottom of the Pinch Roller.

5. Remove the C-ring bearing retainers from inside the Pinch Roller.

6. Install the C-ring bearing retainers on the inside of the replacement Pinch Roller.

7. Place one of the ball bearings in the Pinch Roller assembly.

8. Place the Pinch Roller assembly on the Pinch Roller shaft with the ball bearing installed in Step 7 at the bottom.

9. Slip the spacer onto the Pinch Roller shaft.

10. Install the upper ball bearing.

11. Install the Pinch Roller Retainer and its mounting screw.

12. Test the Pinch Roller to see that it spins freely.

5-21. MUTING SWITCH ADJUSTMENT

Muting Switch SW707 1–2 should be closed when the Function Lever is in the STOP and REWIND position, and open in the PLAY position of the Function Lever.

5-22. SWITCH MAINTENANCE AND ADJUSTMENT

1. To remove the RECORD switch from the A11 Board or C9 Board, first remove all solder from the switch connections using a vacuum-type desoldering tool such as the UNGAR Model 7800 or ENDECO Model 100A. The switch can be lifted off the board easily when all solder has been removed. This procedure applies to the METER SELECT switch and other multi-contact components mounted on the printed boards.

2. Removing the Record Switch SW713, Editing Switch SW705 and Sound Dub Switch SW706.

   a. Remove the four Screws that hold the Printed Circuit Board A10 and remove the Printed Circuit Board Holder.

   b. Hold the lower side of Printed Circuit Board and turn it.

   c. The Mounting Screws for the Micro Switch are now accessible.

3. Replacement and adjustment of Record Switch.

   a. Install the two Screws (a) and washers and lock washers as shown in Fig. 5 - 20.

      Do not tighten the Screws all the way and push down the Recording Button.

   b. Insert the 0.5mm thickness gauge between Stem A and Switch SW713.

   c. Push the SW708 to Stem A and tighten the Screws (a).

   d. Remove the thickness gauge.

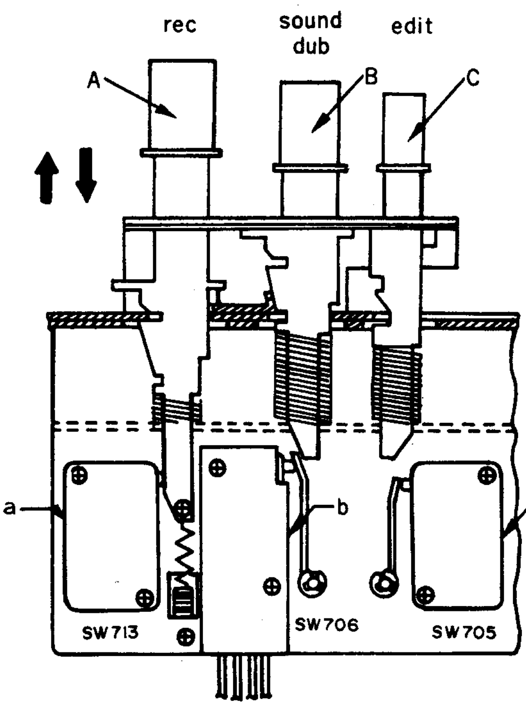


Fig. 5-20. Adjustment of the clearance of SW713, SW705, and SW 706,

4. Replacement and adjustment of the Edit Switch and the Sound Dub Switch.

   a. Install the two Screws (b) Washers and Lock Washers.
      Do not tighten the Screws all the way.

   b. Push down the Sound Dubbing Button.

   c. Push the Microswitch SW706 to the Stem B and tighten the Screw (b).

      This procedure applied to the Editing Switch adjustment.

5. Replacing the Power Switch

   a. Remove the two Philips Head Mounting Screws for the Motor Switch SW714.

   b. Unsolder the Leads from Microswitch.

   c. Solder the Leads to the new Microswitch.

   d. Put the new Microswitch into place.

   e. Install the two Screws.

   f. Adjust the position of Microswitch to get 0.5-1mm clearance between Microswitch and Cam when the Function Lever is set to PLAY and REWIND position and the actuating button should not contact with cam when the Function Lever set to Stop position. Refer to Fig. 5-21.

5-23 MUTING SWITH ADJUSTMENT

1. Loosen two screws marked a in Fig. 5-22.

2. Set the Function Lever to PLAY and then move the FAST FORWARD lever to the left slowly.

3. Move the muting switch following the arrow Ⓨ so that the gap between knob and switch frame (*1 in Fig.5-22.) becomes zero.

4. Tighten two screws marked ⓐ in Fig. 5-22.

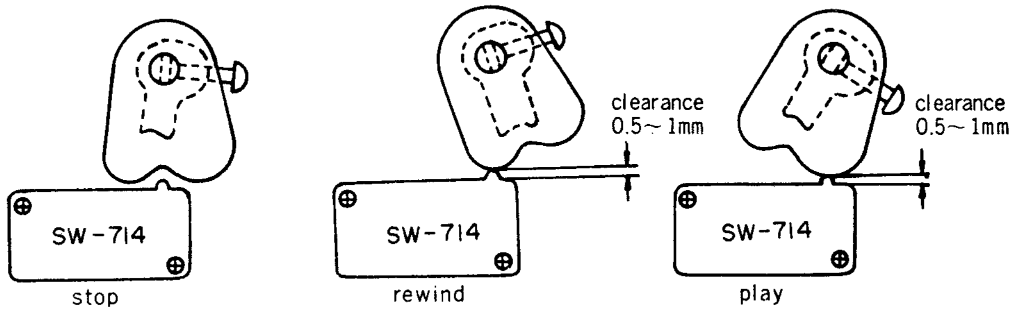

SW-714
stop
SW-714
rewind
clearance
0.5~1mm
SW-714
play
clearance
0.5~1mm

Fig. 5-21. Adjustment of the clearance of Power Switch.

5. Set the FUNCTION LEVER to STOP and then to PLAY slowly and confirm that the Gap between knob and switch frame (*2 in Fig. 5-22) is zero.

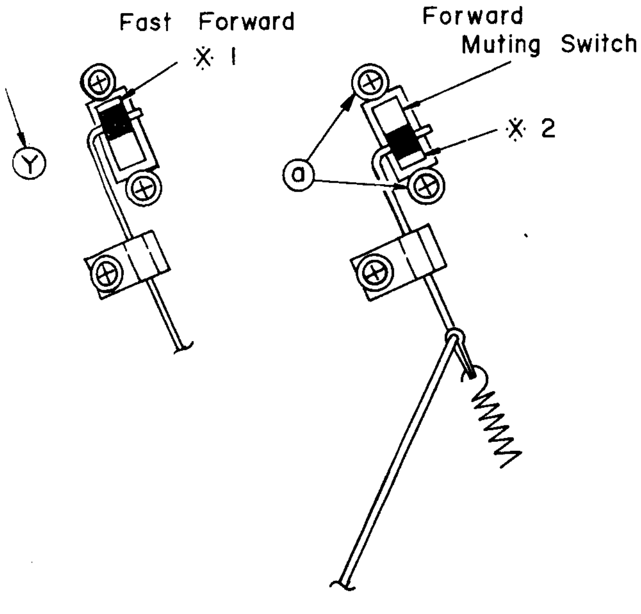

Fast Forward
※ 1
Forward
Muting Switch
※ 2
Ⓨ
ⓐ

Fig. 5-22. Adjustment of the Muting Switch.

WARNING

Do not attempt to make electrical adjustments unless the correct equipment is at hand. Avoid needless adjustments. Factory-made adjustments are extremely stable and should not require readjustment unless circuit failures necessitate component replacement. In general, confine alignment adjustments to those stages directly affected by component replacement.

SECTION 6

VIDEO SYSTEM ALIGNMENT

6-1. EQUIPMENT REQUIREMENTS

The following test equipments are suggested for use in Authorized SONY Service Stations.

a. Monitor - SONY CV-Monitor (CVM-306UBP, CVM-306UMP CMV-51UMP)

b. Oscilloscope - Tektronix Type 310A, Heath IOW-14, or equivalent.

c. Audio Generator - Heath IGW-72, or equivalent.

d. AC VTVM (Audio) - Heath IMW-21, or equivalent.

e. Volt-Ohm-Milliammeter - Simpson 260, or equivalent.

f. Pre-recorded Video Tape -

g. Video Signal Generator - Eico 380, or equivalent.

* Off the air test pattern video signal is available.

h. R-F Signal Generator - RCA WR-50B, or equivalent.

The following test equipments are required for use at Factory Service Stations.

a. Monitor - SONY CV-Monitor

b. Oscilloscope Tecktronix 422 or 561A with 3A1, 3B3 plug-in unit. Tektronix 310A(can be used for troubleshooting and relatively minor adjustments).

c. Video Signal Generator - Telement 3502A1. Stair-Step Generator, or equivalent.

d. Audio Generator - Heath IGW-72, or equivalent.

e. AC VTVM (Audio) - Hewlett Packard 400D, or equivalent.

f. Volt-Ohm-Milliammeter - Simpson 260, or equivalent.

g. Pre-recorded Test Tape - SONY Standard Tape.

h. R-F Signal Generator - Tektronix 191, or equivalent.

*The SONY CVM 306UBP, 51UETP, 51UMP is a necessary piece of test equipment, and should be part of every VTR test bench. It provides E-to-E operation in the TV-RECORD mode, and so permits checking of all the video circuits with the exception of record amplifiers and Playback preamplifier stages.

6-2. E-TO-E MODE ADJUSTMENTS

The following adjustments are made with the VTR operated in the TV-RECORD mode. Adjustment sequence is based on a complete alignment.

Equipment Connections

Video Input Stairstep Signal - Composite video, 1.4 Vp-p, sync negative, applied to pins 3 and 4 of the TV jack (pin 3 grounded).

Video Output - SONY CV Monitor

Oscilloscope - As shown in Fig. 6-2.

R-F Signal Generator - As shown in Fig. 6-2.

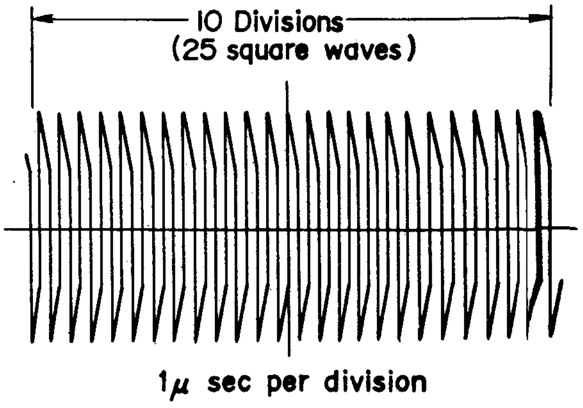
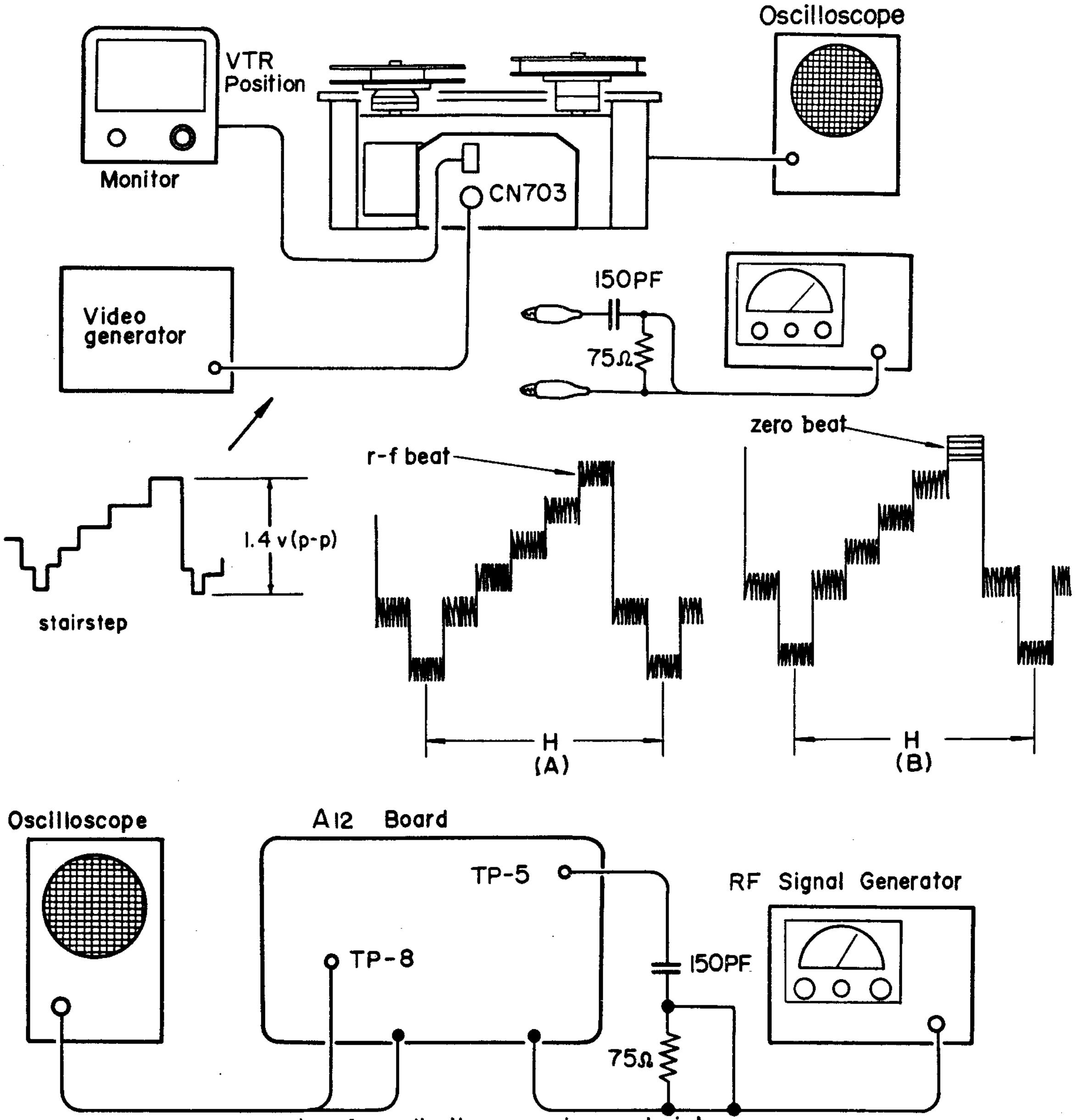


Fig. 6-1. Measuring carrier frequency of 2.5 MHz with a scope.

Step	Function	Indication	Adjustment
1	Carrier Frequency (Clamp Level)	Scope TP-3 R301	Set R702 (500 ohms) fully counterclockwise. Set R-305 (1K ohm) on the All board fully clockwise. Connect the scope at TP-3 and adjust scope time base for 1μ sec. per division CAUTION: Check scope's time-base calibration before making adjustments. Set scope controls to obtain a stable trace. A correct carrier frequency of 2.5 MHz is indicated when there are 25 complete square waves in 10 division. Turn R301 (1K ohm) slowly from fully counterclockwise position, a correct carrier frequency of 2.5MHz is indicated when there are 25 complete square waves in 10 divisions. Set R301 to produce this indication . See Fig. 6-1.


Oscilloscope
VTR Position
Monitor
CN703
Video generator
150PF
75Ω
stairstep
1.4 v(p-p)
r-f beat
zero beat
H
(A)
H
(B)
Oscilloscope
A12 Board
TP-5
TP-8
RF Signal Generator
150PF
75Ω

setup for adjusting maximum deviaton

Fig. 6-2. Setup for measuring maximum deviation.

Step	Function	Indication	Adjustment
2	Max. Deviation VIDEO LEVEL R702	Scope TP-8	Adjust scope controls to observe one horizontal line. Connect the R-F signal generator to TP-5 using the coupling network shown in Fig. 6-2. Set the R-F Generator to 4.6 MHz. Adjust generator output to get an r-f indication on the "steps" of the staircase signal as shown in A of Fig. 6-2. Advance VIDEO LEVEL (R702) and observe the "top step" peak-white part of the signal. When peak deviation reaches 4.6 MHz, a zero beat will be observed at the top step as shown in B of Fig.6-2. Video Level is now set to produce the maximum deviation allowed by the system. Do not reset VIDEO LEVEL until this series of adjustments is complete. Disconnect the R-F Generator. Repeat Steps 1 and 2.
3	Video Output Level R207	Scope TP-8	Adjust R444 to produce 1.4 Vp-p at TP-8.

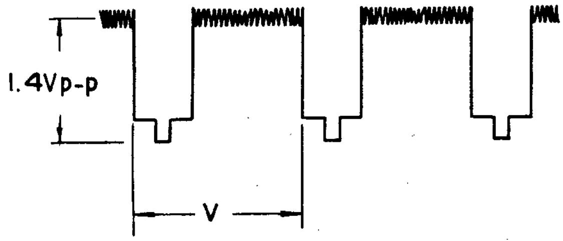


Fig. 6-3-1 Wave form at TP-8

Step	Function	Indication	Adjustment
4	Video Level Meter Calib. R455	Scope TP-8	Set the METER SELECT switch to VIDEO. Adjust R455 to produce a Video Level reading at a third of red zone as shown in Fig. 6-3-2". Steps 1-4 are inter-related. If adjustments are made at any one of these potentiometers, the settings of all four should be checked.

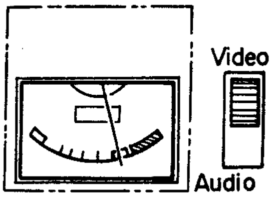
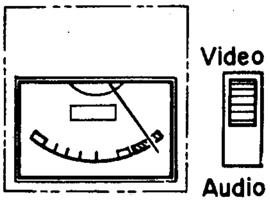


Fig. 6-3-2. Video Level Meter Calibration

Step	Function	Indication	Adjustment
5	White Clipping R305	Scope TP-2	At the condition of Step 4, increase the video level by turning the R702 until peak-white parts of the waveform show the first sign of compression. Check the video signal level picked off at the arm of R702.Video signal level should be within 1.5+0.1 Vpp.If not, follow the next procedures.



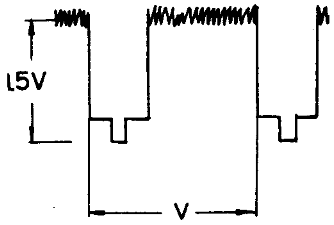


Fig 6-3-3

(a) Turn the R305 (B-1K) in A11 circuit board fully clockwise.

(b) Apply a stairstep video or conventional video signal to the video input terminal.

(c) Adjust the video level control (R702) to produce 1.6 Vp-p at TP-8.

(d) Adjust the R305 again counterclockwise to obtain 1.5 Vp-p output at TP-8.

Step	Function	Indication	Adjustment
6	Noise-Cancel Adjust R454	Monitor Screen	Use an off-the-air signal, preferably a test pattern, for video input. Adjust VIDEO LEVEL for a reading in the blue zone. Adjust R454 (2K ohms) for minimum noise in the picture, but ovserve resolution carefully. Set R-454 for the minimum noise without a reduction in resolution.

6-3. RECORD-MODE ADJUSTMENTS

The following adjustments set the level of signal applied to video heads for recording purpose. Thread a tape (not the Standard Tape).

Step	Function	Indication	Adjustment
1	Video Recording Current R320 (321)	Scope TP-9	A. Set up the E-to-E mode using an off-the-air signal, preferably a test pattern. B. Connect a microphone to the MIC. IN jack. Set audio and video levels. Set the scope of 0.1 v/cm vertical deflection. 3 ms/cm horizontal deflection. C. Connect a scope at TP-9 (or TP-10) of the A11 board. D. Turn R320 (200 ohms) and R321 (200 ohms) fully counterclockwise. E. Start recording off-the-air picture. F. Turn R320 clockwise slowly as you observe the scope. Set the recording level to each of the following voltage values. At each increment, call out the voltage reading into the microphone. 2.0, 2.2, 2.4, 2.6 Volts. G. Rewind the tape.
		Scope TP-3	H. Reconnect the scope to TP-3 of the All board and playback the recorded voice. I. Find the voltage as indicated by the recorded voice, when the video playback output shows a maximum on the scope.
		TP-9	J. Set up the recording mode again. Connect the scope to TP-9. Adjust R320 to the voltage that produced maximum output in step (I). K. Make a recording after R320 has been adjusted, and make sure the picture is satisfactory. If the picture is not satisfactory, readjust R320 slightly to produce the best-quality picture. L. Make same procedure with R321.

6-4. PLAYBACK-MODE ADJUSTMENTS

The following adjustments are made with the VTR in the Playback Mode. Thread the test tape (SONY Standard Video Test Tape).

Step	Function	Indication	Adjustment
1	Playback Head Balance R380	Scope TP-3	Set the scope for: 0.1 v/cm vertical deflection. 0.3 ms/cm horizontal deflection Playback the monoscope pattern portion of the test tape. During playback, adjust R372 (500 ohms) of the A11 board to have the same output, more than 0.6 Vp-p

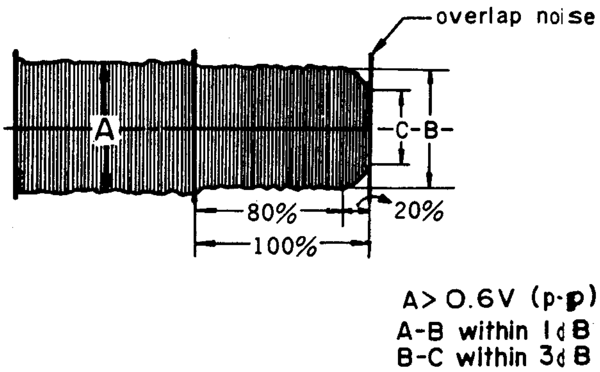


Fig. 6-4. Video-head balance check.

Step Function	Indication	Adjustment
2 Head Resonance R349, R365 (Alternative Procedure)	Monitor Screen	Turn C322 and C330 to minimize noise on the screen. When the noise is minimized, the highlights should also show a minimum of flicker.
3 Playback Head Amp Freq. Equalization R385	Monitor Screen	Play back the standard video test tape and look carefuly at the screen. Turn R378 to minimize noise on the screen. When the noise is minimized, the highlights should also show a minimum of flicker.

6-5. CARRIER LEAK ADJUSTMENTS

The term carrier leak refers to the appearance of carrier-signal energy in the picture. It looks like coarse FM interference (herringbone lines). To minimize the carrier leak, the FM signal waveform must be symmetrical throughout the r-f system, from the modulator to the demodulator. The sequence of adjustments, given below gives fast effective results with little backtracking. A minimum of test equipment is required for these adjustments.

6-5A. Field Adjustments

1. Check carrier frequency and maximum deviation. See **Section 6-2-1** and **Section 6-2-2**
2. Make a recording with normal video level (disregard any carrier leak that appears in the E-to-E picture at this point).
3. Playback the recorded tape.

   Adjust R428 (200 ohms) and R435 (100 ohms) on the A12 board to minimize carrier leak (herringbone). Repeat both adjustments. Carrier leak appears as a beat-note in the picture; it is similar to FM interference.
4. Continue to playback the tape and adjust R388 (1K ohm) on the All board to produce maximum output with minimum carrier leak in the picture.
5. Measure the input level to the Limiters at the base of X401 with a scope, and make a note of the reading.
6. Adjust R317 (200 ohms) for minimum carrier leak. Note, if little effect is seen, set R317 to mid range.
7. Move the Function Lever to PLAY while holding the RECORD button down. Check to see if carrier leak increases. If it does, adjust R314 (Symmetry Adjust) to minimize carrier leak. Recheck the picture in the E-to-E and RECORD mode to see if there is a change in carrier leak. Adjust R314 to minimize the carrier leak.
8. Repeat adjustments of R428 (200 ohms) and R435 (100 ohms) on the A12 Board with the machine in the E-to-E mode. (Carrier leak is somewhat easier to see when the machine is in the E-to-E mode, so that fine adjustments are made more effectively.
9. Repeat Steps 1-7.
10. Note, any adjustments made in the Modulator (R317 and R314) will affect acrrier frequency. Always check carrier frequency after Modulator adjustments are made.

6-5B. FACTORY BRANCH ADJUSTMENT

This procedure requires the use of a dual-trace oscilloscope, such as the Tektronix 422 or 516.

1. Check carrier frequency. See Section 6-2.
2. Connect both vertical-input leads of the scope to TP-3.
3. Set up the E-to-E mode.

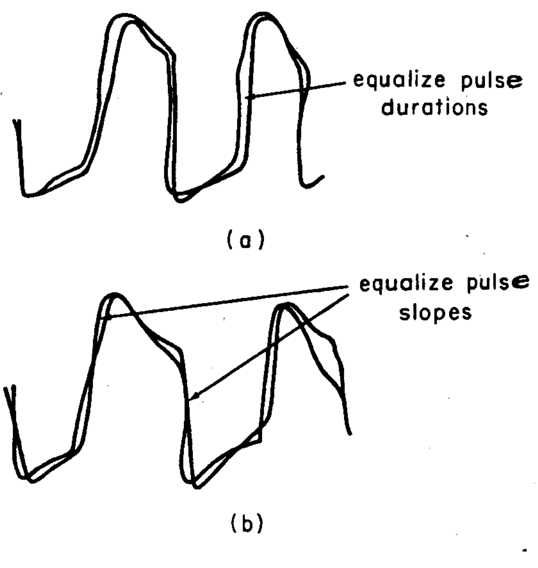


Fig. 6-5. Symmetry adjustments.

4. Set the MODE control on the scope to the ALT position. Adjust the scope for stable traces in which the two traces are superimposed.
5. Adjust C308 to obtain equal pulse durations. See Fig. 6-5a.
6. Adjust R317 to obtain equal pulse slopes. See Fig. 6-5b.
7. Repeat Steps 5 and 6 to obtain symmetrical waveforms.
8. Adjust R301 to obtain a carrier frequency of 2.1 MHz.
9. Adjust R314 and R317 to produce symmetrical waveforms.
10. Reset R301 to produce the correct carrier frequency of 2.1 MHz.
11. Trim up R317 and C308 to obtain waveform symmetry.
12. Check symmetry at 2.1 MHz and 3.8 MHz. Reset carrier frequency to 2.1 MHz.
13. Set up a normal TV picture, preferably a test pattern, using the E-to-E mode.
14. Adjust R428 and R435 for minimum carrier leak in the picture.
15. Make a short recording and playback the tape. Set R388 for maximum drive to the limiters without carrier leak appearing in the picture. At this point the input level to the limiters should be nearly equal to that set in Step 14.
16. If carrier leak is still visible, repeat Steps 14-15.
17. Turn the R445 clockwise to minimize noise and carrier leak, but watch resolution carefully. If R454 is advanced too far, resolution decreases.

6-6. AGC ADJUSTMENTS

The following adjustments are made with the VTR in the E-to-E mode and the AGC/MANU Switch set to the AGC position.

Adjust the monitor for an on-the-air picture, but it is preferable to make this adjustment with a test pattern.

Step Function	*Indication*	*Adjustment*
1 Clamp Level R205 (R201)	VOM X203 Base	A. Turn R201 (100 ohms) fully counterclockwise. B. Connect 1.4 Vp-p Video signal to CN703. C. Adjust R205 (1K ohm) to obtain 1.8V (1.65 - 1.8 V) at X203 Base.

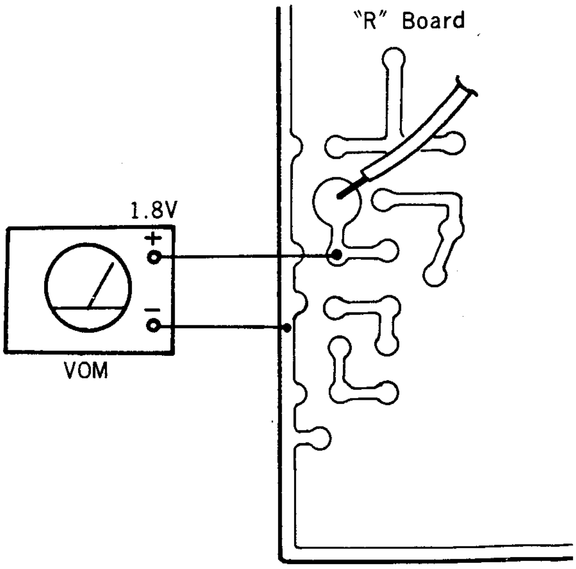


Fig. 6-7. Response adjust

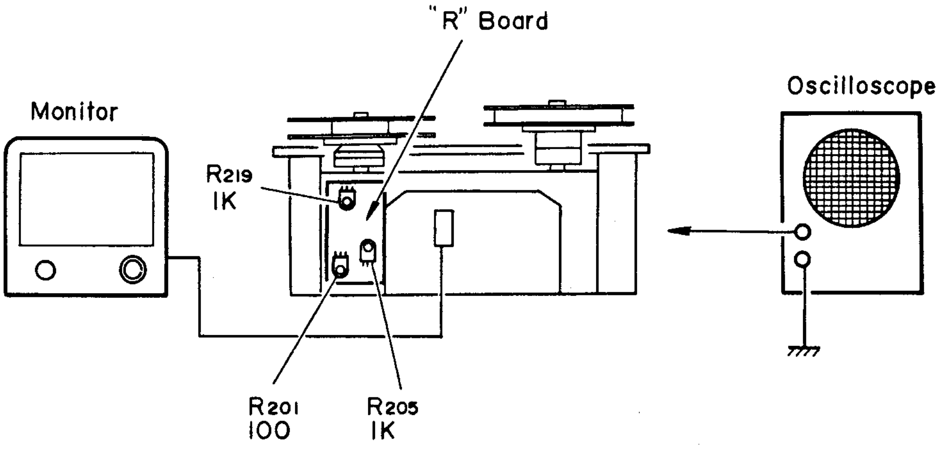
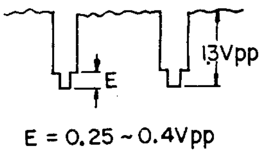


Fig. 6-6. Video AGC Adjustment

Step Function	*Indication*	*Adjustment*
2 Output Level R219	Scope TP-13 TP-8	A Connect 1.4Vp-pVideo signal to CN703. B. Connect the scope at TP-13 to make sure the Video level is 1.4Vp-p. C. Connect the scope TP-8 on the A10 Board. D. This video level is between 1.0 - 1.4Vp-p. E. In case of video level is low or high, Adjust R219 (1K ohm) to the display amplitude of 1.3Vp-p


1.3Vpp
E
E = 0.25 ~ 0.4Vpp

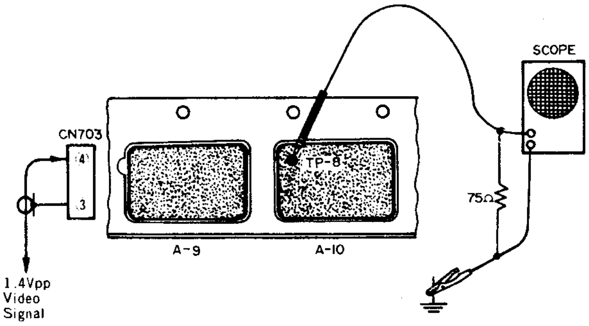

SCOPE
CN703
4
3
TP-8
75Ω
A-9
A-10
1.4Vpp
Video
Signal

Fig. 6-8. Output Level adjust

SECTION 7

SERVO AND PULSE-SYSTEM ALIGNMENT

7-1. MAIN AND SUB BRAKE COIL CURRENT ADJUSTMENT

The gap between the stator and rotor of the brake coil is set to obtain correct braking action with the design current flowing in the coil.

Equipment required for the checkout and adjustment procedures consists of:

(1) A VOM, capable of indicating d-c current of 50mA or more.

(2) A frequency counter: capable of indicating AC line frequency, or an oscilloscope Tektronix Type 422, 561A or equivalent.

Step	Function	Indication	Adjustment
1	Confirm the line frequency is within 50±0.5 Hz.		

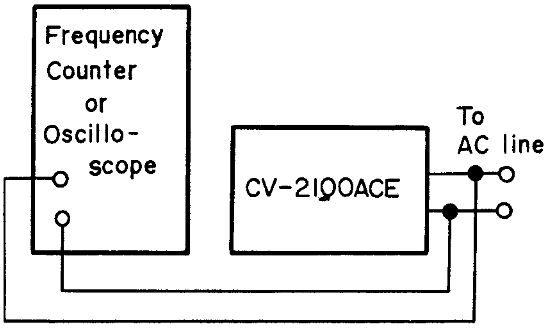


Fig. 7-1. Check the line frequency

Step	Function	Indication	Adjustment
2	Disconnect the blue lead of the brake coil from the terminal strip mounted near the brake coil and insert the d-c ammeter in series as shown in Fig. 7-2 .		
3	E-E MODE		Set TV/CAMERA switch to CAMERA position. Set the STANDBY switch to OFF position. Allow 5 minutes for warm up at normal horizontal position.
4		Ammeter	Turn the R704 (500 ohms) on the chassis near drum ass'y to obtain a reading of 24 mA D.C.
5		Oscilloscope TP-22	Connect the vertical-input probe of the scope to TP-22(50 PG). Set the scope sync selector to the LINE position and adjust the scope for a stable trace. Adjust R708 (500 ohms) until the 50 PG is stationary on the scope trace. If a stationary 50 PG cannot be obtained, reset R704 for an ammeter reading of 24mA ± 1mA.
6			If the condition of step-4 cannot be obtained, loosen the mounting screws of the stator coil and adjust the gap between the rotor and the stator until a stable condition is achieved with 23 to 25mA of brake current.
7	Reconnect the brake-coil lead to the terminal strip.		

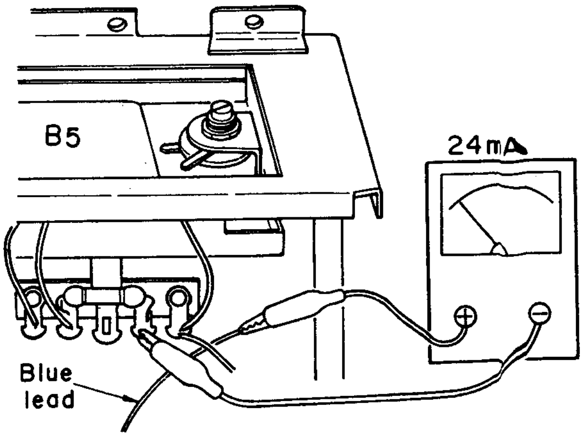


Fig. 7-2. Setup for measuring brake sensitivity

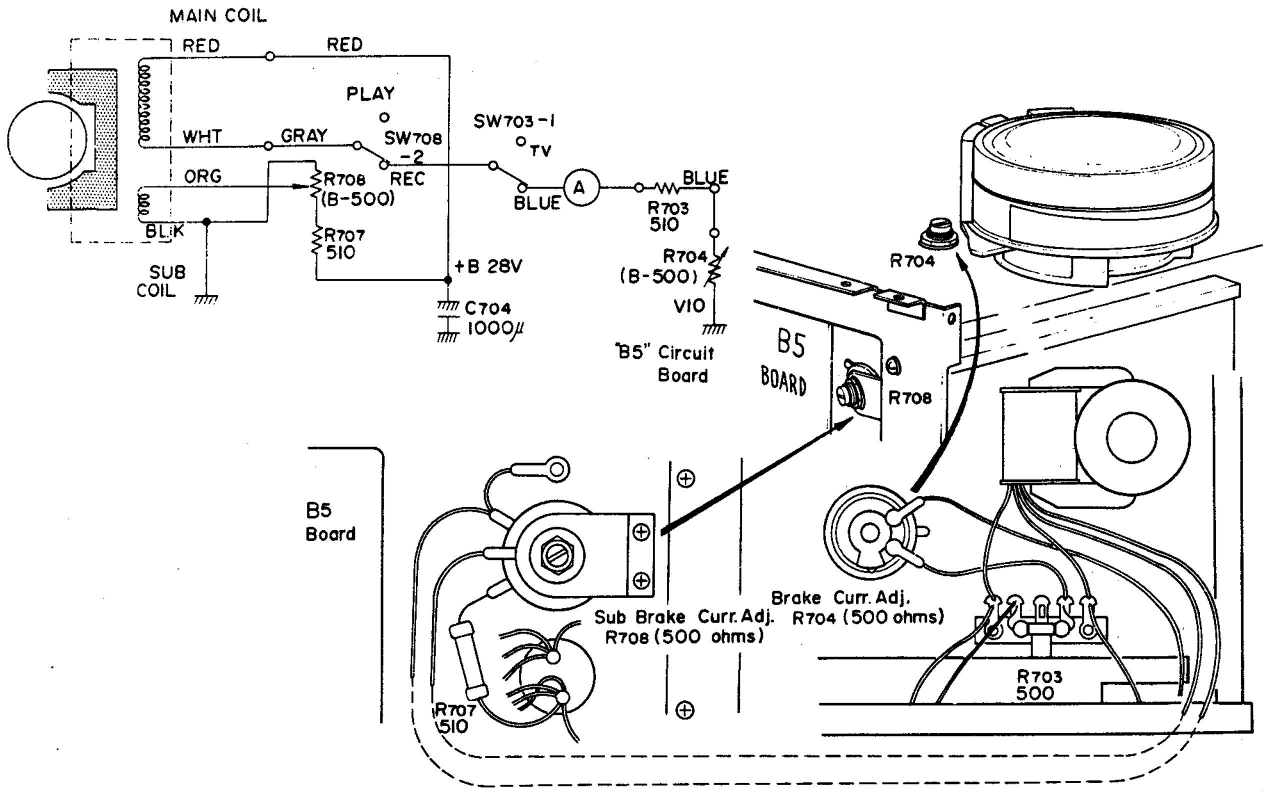

MAIN COIL
RED
RED
PLAY
WHT
GRAY
SW708 -2
SW703-1
TV
ORG
R708 (B-500)
REC
BLUE
A
BLUE
R703 510
BL'K
R707 510
SUB COIL
+B 28V
R704 (B-500)
VIO
C704 1000µ
"B5" Circuit Board
B5 BOARD
R704
R708
B5 Board
Brake Curr. Adj. R704 (500 ohms)
Sub Brake Curr. Adj. R708 (500 ohms)
R703 500
R707 510

Fig 7-3 Main and Sub Brake coil current Adjustment

7-2. SERVO RESPONSE TIME ADJUSTMENT

Serious deficiencies in performance such as "hunting" picture will result if this adjustment is made improperly.

Equipment required for the checkout and adjustment procedures consists of:

(1) Recorded Tape, Recorded Test Tape, or equivalent. (Test Tape)

(2) A TV Monitor: SONY CVM-51UETP, or CVM-306UMP

(3) A Stopwatch:

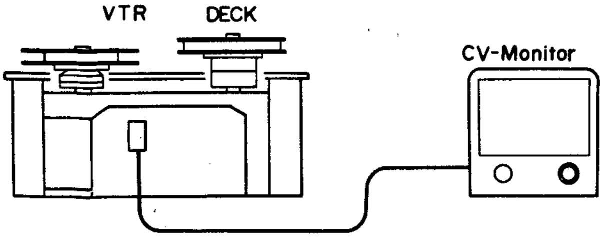

VTR
DECK
CV-Monitor

Fig. 7-4. Servo response time adjustment test set-up

Step	*Function*	*Indication*	*Adjustment*
1	STOP MODE		Thread the recorded tape.
2	E-E MODE		Allow a few minutes for warmup.
3	PLAY MODE	Monitor	Turn the Function lever to PLAY position and check the time it takes for the picture on the monitor to stabilize (stop rolling vertically). Repeat this operation a few times. The picture on the monitor should be stabilized within 6 seconds, after turning the function lever to PLAY position. If not, proceed to Step 4.
4	PLAY MODE	Monitor	If it takes too much time to get the stabilized picture or "hunting" trouble is occured, adjust the R-536 (hunting adjuster) in "B5" circuit board to reduce the servo response time. If this control is

Step	Function	Indication	Adjustment
			advanced too far the servo will hunt, as evidenced by a rhythmic sideways shift in the picture during playback. Hunting also appears a rythmic vertical "bounce" in the picture.

7-3. SERVO SYSTEM CHECKOUT AND ADJUSTMENT

Following procedures are necessary for maintaining the proper operation of servo system.

Equipment required for the checkout and adjustment procedures consists of:

(1) An oscilloscope: Tektronix Type 422, 561A or equivalent.

(2) A TV Monitor: SONY CVM-51UETP, or CVM-306UMP.

Step	Function	Indication	Adjustment
1	Set the TV/VTR switch of monitor TV to TV and receive the off-the-air test pattern signal.		
2	Turn the TV/VTR switch to VTR.		
3	Record Mode AUTO/MANUAL switch is AUTO position. TV/CAMERA switch is TV position.		Hook the shutoff switch up by rubber band not to operate even if the tape is not threading in tape path.
4			Set the oscilloscope function control as follows. Triggering Mode: EXT position, Connect a lead wire between TP 22 in "B5" board and EXT TRIGGER IN. TIME/CM: 5msec INPUT SELECTOR: AC Mode
5	Check and Adjust the wave forms at TP–19, TP-20, TP-21 and TP-18 as follows.		
	RECORD MODE	Scope TP-19 "B5"	Adjust the R525 (B-50K) to obtain T = 15 ±1 msec E = More than 18 Vp-p as shown in Fig. 7-6.

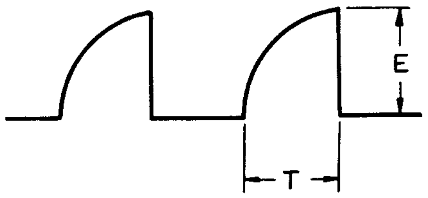


Fig. 7-6.

Step	Function	Indication	Adjustment
6	RECORD	Scope TP-20 "B5"	Confirm that the pulse level is kept within the value as follows. E = 7 to 10 Vp-p as shown in Fig .7-7 Injected field pulse should not be intermittent. If the unstable pulse observed, check the belt for brake coil, or d-c servo amplifier.

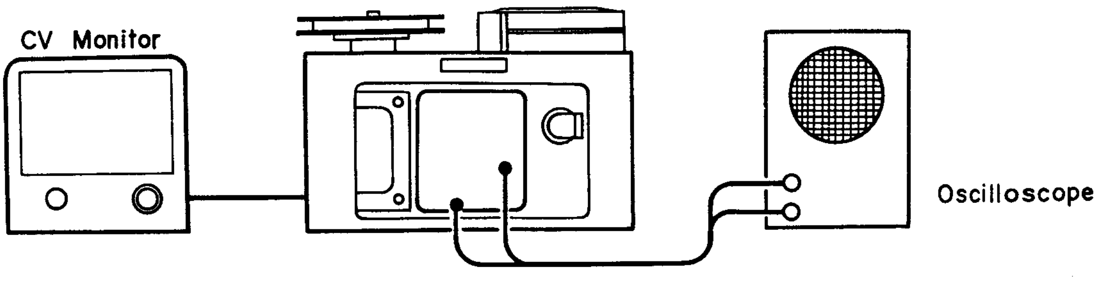


Fig. 7-5. Servo system checkout and adjustment test set-up

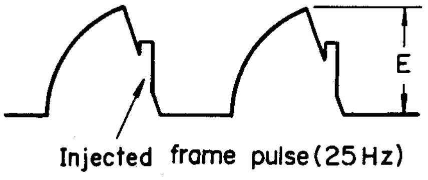


Fig. 7-7.

Step	Function	Indication	Adjustment
7	RECORD MODE	Scope TP-21 "B5"	Confirm the pulse level is more than 2 Vpp. If not check the 25Hz amplifier. E = More than 2 Vp-p as shown in Fig. 7-8.

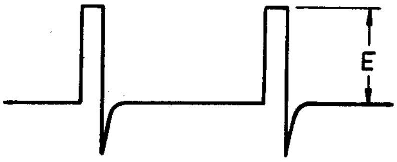


Fig. 7-8.

Step	Function	Indication	Adjustment
8	RECORD MODE	Scope TP-18	Confirm the pulse level is more than 5 Vp-p If not, check the monostable multivibrator. E = More than 5 Vp-p as shown in Fig. 7-9.

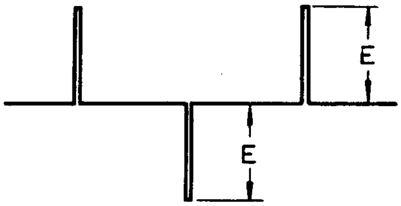


Fig. 7-9.

Step	Function	Indication	Adjustment
9			Turn the function lever to STOP position. Rewind the tape to the beginning of the video signal recording.
10	PLAY MODE	Scope TP-20 "B5"	Confirm that the pulse level is kept within the value mentioned in below. E = 7 to 10 Vp-p as shown in Fig. 7-10. Injected field pulse should not be intermittent. If the unstable pulse observed check the belt for brake coil, or d-c servo amplifier.

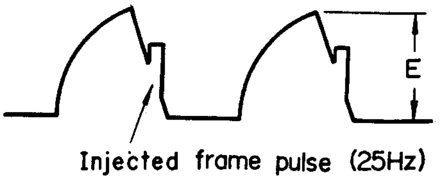


Fig. 7-10.

Step	Function	Indication	Adjustment
11	PLAY MODE	Scope TP-15 "B5"	Confirm the pulse level is more than 0.5 Vp-p E = 0.5 Vp-p as shown in Fig. 7-11. If the output pulse is small, check the azimuth adjustment of control head.

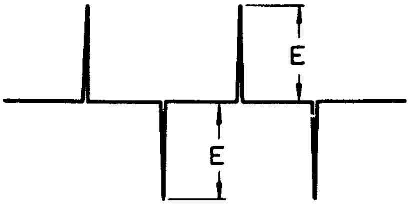


Fig. 7-11.

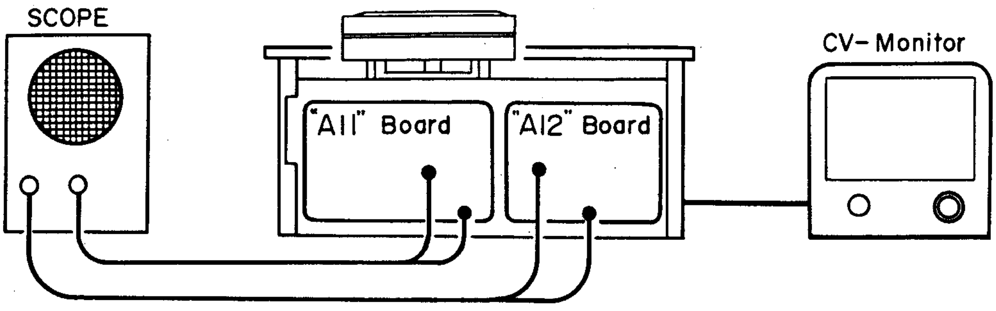


Fig. 7-12. Delay multivibrator Adjustment Test Set-up

7-4. DELAYTIME ADJUSTMENT

Servo-Reference Delay Multivibrator Adjustment. The servo reference delay multivibrator adjusts the timing interval between the 50 PG pulse and the vertical sync signal during RECORD operation. This adjustment establishes the mutual interchangeability tape.

Equipment required for the checkout and adjustment procedures consists of :

(1) An oscilloscope : Tektronix Type 545B ,
(2) TV Monitor: SONY CVM-51 UETP, or CVM-306 UMP
(3) Pre-recorded test tape: SONY Standard Tape (CCIR)
(4) Video Tape: V-32

Step
Function Indication Adjustment

7-4A. FIELD PG POSITION (PHASE) CHECK AND ADJUSTMENT

Step
Function Indication Adjustment

---

1. Set the TV/VTR switch of the monitor TV to "TV" position and receive the off-the-air test pattern signal or on-the-air signal (finest station).

2. Turn the TV/VTR switch to VTR position. Set AUTO/MANUAL switch on the VTR to AUTO position.

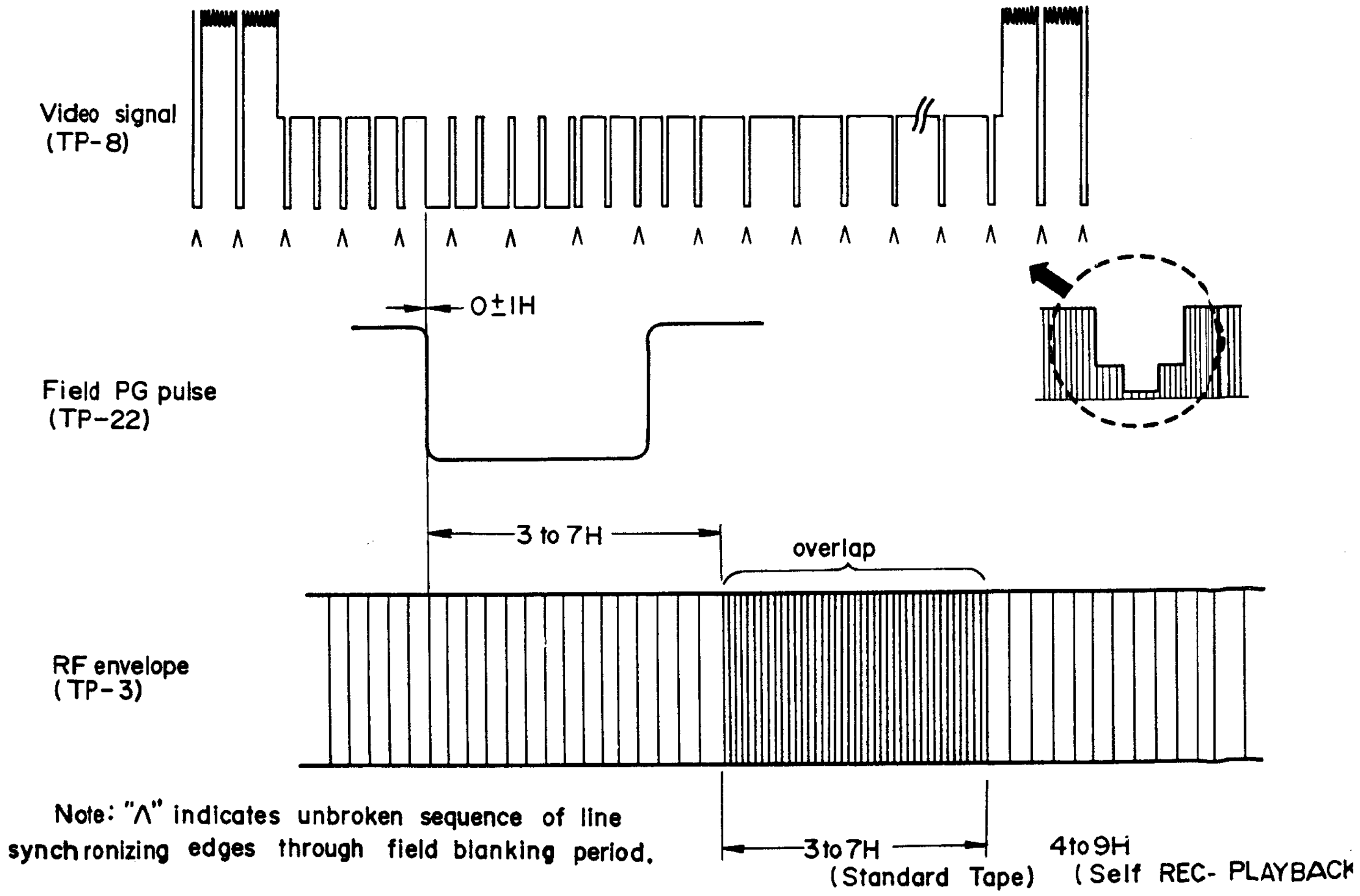
3. Set the oscilloscope function control as follows.

INPUT MODE.... CHOP position.
SELECTOR

INPUT .... AC position
SELECTOR

CH1 INPUT .... Connect to TP 8 ("A12" Board)

CH2 INPUT ....Connect to TP 22 ("A11" Board)


Video signal (TP-8)
Λ Λ Λ Λ Λ Λ Λ Λ Λ Λ Λ Λ Λ Λ Λ Λ Λ Λ
0±1H
Field PG pulse (TP-22)
3 to 7H
overlap
RF envelope (TP-3)
3to7H (Standard Tape)
4to9H (Self REC- PLAYBACK

Note: "Λ" indicates unbroken sequence of line synchronizing edges through field blanking period.

Fig. 7-13. Details of field synckronizing waveform

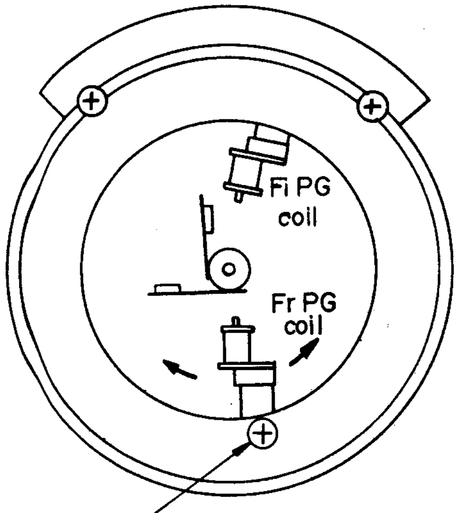
TIME BASE "A"

STABILITY	Fully clockwise
TRIGGERING LEVEL	Any position
TIME/CM	0.2 msec
TRIGGERING MODE	AC position (EXT)
TRIGGER	EXT - (Connect to TP22) ("B5" Board)
HORIZONTAL DISPLAY	"A" DELAYED BY "B" position

TIME BASE "B"

STABILITY	PRESET position
TRIGGERING MODE	AC position
TRIGGERING SLOPE	EXT - (Connects to TP22) ("B5" Board)
TIME/CM	2 msec
TRIGGERING LEVEL	On the position where stable waveform can be ovserved.

4. Make into E-to-E mode.
5. Make sure that the leading edge of a Field PG pulse meets with a leading edge of vertical sync pulse (VD) as shown in Fig. 7-13.
   If not, proceed the following steps.



Loosen this screw and move Fr PG coil.

Fig. 14. Frame PG coil adjustment.

6. Loosen the screw which secure the frame PG coil (25 Hz). Move the coil to right or left slightly so that the leading edge of field PG pulse (50 Hz) come within 0 ± 1 horizontal line from the leading edge of vertical sync pulse. See Fig. 7-13 and Fig. 7-14.

Notes:

(1) Turn off the motor before frame PG adjustment.

(2) Do not touch the Field PG coil.

(3) The core of frame PG coil should be oriented toward the drum center.

7-4B. OVERLAP CHECK

1. Set the scope controls as in preceding section.
2. Connect the probe of CH-1 to TP-8 and CH-2 to TP-3.
3. Thread the standard tape and playback the tape.
4. Make sure that the front edge of overlap comes to within 3 to 7 horizontal lines from the leading edge of vertical sync pulse (VD) as shown in Fig. 7-13.
5. Thread a tape (not Standard Tape) and make a recording.
6. Playback the tape. Make sure the front edge of overlap comes to within 4 to 9 horizontal lines from the leading edge of vertical sync pulse (VD) as shown in Fig. 7-13.

SECTION 8

AUDIO SYSTEM ALIGNMENT

8-1. AZIMUTH ADJUSTMENT

1. Playback a 10 kHz signal recorded portion of the SONY Audio Standard Tape.
2. Set the METER SELECT switch to AUDIO.
3. Adjust Azimuth for maximum indication on the meter. See Fig. 8-1.

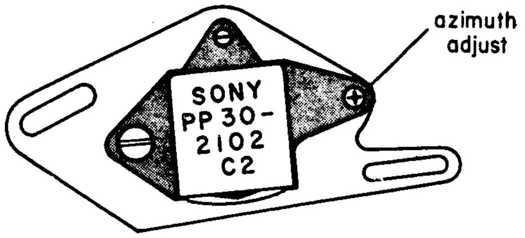

azimuth adjust
SONY PP 30-2102 C2

Fig. 8-1. Azimuth Adjustment

8-2. SWING ADJUSTMENT

Perform the Swing Adjustment of the AUDIO /CTL Head with the set screw located on the rear of the AUDIO/CTL Head so that the face of the AUDIO/CTL Head is positioned parallel to the face of the Capstan.

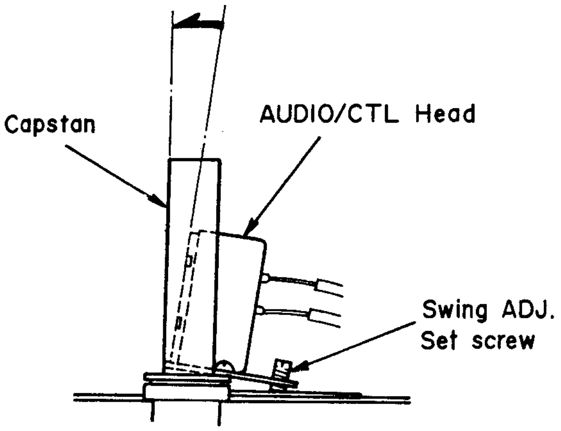

Capstan
AUDIO/CTL Head
Swing ADJ. Set screw

Fig. 8-2. Swing adjustment

8-3. HEIGHT ADJUSTMENT

1. Playback the Audio Standard tape and check to see that the head core extends an equal amount above and below the edges of the tape. See Fig. 8-3.
2. Adjust the screw A, B and C slightly, until the above-mentioned condition is reached.
3. If it is unable to obtain the satisfactory result by the above procedure, insert brass spacer beneath the Head for the best result.
4. Re-check the azimuth and swing adjustment.

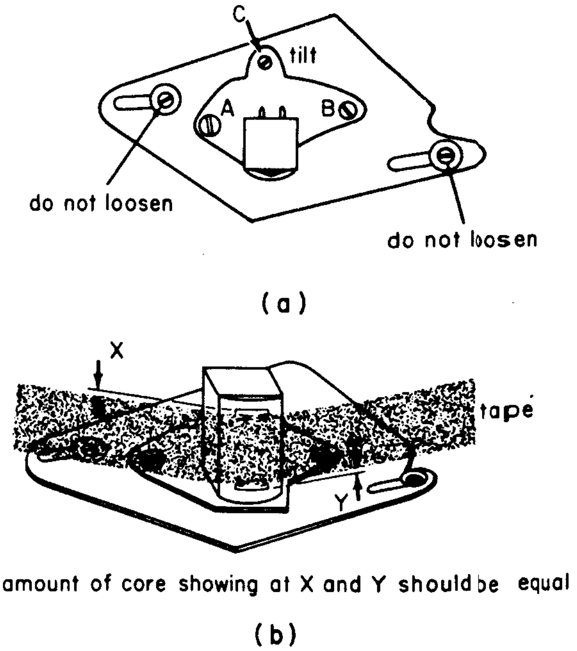

C
tilt
A
B
do not loosen
do not loosen
(a)
X
tape
Y
amount of core showing at X and Y should be equal
(b)

Fig. 8-3. Audio/control head height adjustment

8-4. AUDIO LEVEL METER ADJUSTMENT

Test Equipment
  a. VTVM
  b. Audio Oscillator
  c. Attenuator
  d. 10 k ohm load Resistor

1. Connect a VTVM with a 10 k ohm load resistor in parallel, to AUDIO LINE OUT Jack. Connect Audio Oscillator and Attenuator as shown in Fig. 8-4.

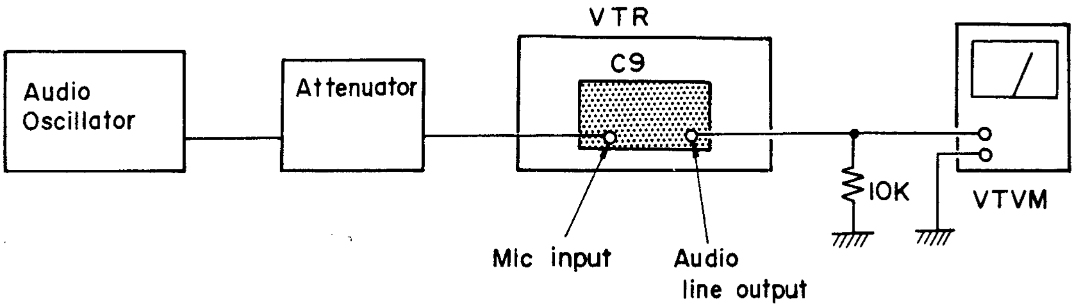


Fig. 8-4. Audio Level Meter Adjustment

2. Set the AGC/MANU Switch to MANUAL.
3. Set up the E-to-E mode.
4. Feed a 1 kHz signal of approx. -65dB (0.4mV) from Audio Oscillator through the Attenuator to the MIC IN jack.
5. Adjust R701 (AF LEVEL) in order to obtain the reading of 0 dB (0.775V) on the VTVM.
6. Set the METER SELECT switch to AUDIO.
7. Adjust R633 to produce a Audio Level reading in the center of blue zone.
8. Change the AGC/MANU Switch to AGC. Confirm that the pointer of the Meter is at 0 (zero) position, and that the output level of LINE OUT is 0 dB ±2 dB.

8-5. AUDIO PLAYBACK LEVEL ADJUSTMENT

Test Equipment

a. VTVM
b. SONY Audio Standard Tape (for CV-2100ACE)
c. 10 k ohm load Resistor.

1. Before the adjustment, perform the AUDIO /CTL Head Azimuth Alignment.
2. Connect a VTVM with a 10 k ohm load resistor in parallel, to AUDIO LINE OUT jack.
3. Playback a 1 kHz signal recorded on the SONY Audio Standard Tape.
4. Adjust R614 (PB LEVEL) to obtain the reading of 0 dB (0.775V) on the VTVM.
5. Confirm that pointer of the Level Meter is at the center of blue zone.

8-6. AUDIO RECORDING BIAS ADJUSTMENT

Test Equipment

a. VTVM

1. Connect a VTVM across the lead of the audio head (top terminals).
2. Thread a tape and set-up the RECORD mode. (FUNCTION LEVER in the PLAY position, RECORD button down).
3. Adjust C624 to produce a 24 volt /rms reading on the VTVM.

8-7. BIAS TRAP ADJUSTMENT

Test Equipment

a. VTVM

1. Connect the VTVM to the LINE OUT jack.
2. Thread a tape and set up the RECORD mode.
3. Turn AUDIO LEVEL fully counterclockwise.
4. Adjust the trap coil, L 601, for a minimum reading on the VTVM.

Note, Bias oscillator frequency: 80 - 110 kHz.

8-8. AUDIO PLAYBACK FREQUENCY RESPONSE ADJUSTMENT

Test Equipment

a. VTVM
b. SONY Audio Standard Tape (for CV-2100ACE)

1. Connect a VTVM with a 10 k ohm load resistor in parallel, to AUDIO LINE OUT jack.

2. Playback a 1 kHz signal recorded portion of the SONY Audio Standard Tape.

3. Confirm that the reading of VTVM is 0 dB (0.775V).

4. Playback a 10 kHz signal recorded portion of the SONY Audio Standard Tape.

5. Adjust R613 in order to obtain the reading of 0 dB (0.775V) on the VTVM.

6. Playback a 1 kHz signal and confirm that the reading on the VTVM is 0 dB (0.775V).

SECTION 9

POWER SUPPLY ADJUSTMENTS

9-1. B + ADJUSTMENT

1. Set the A-C input voltage to rated voltage, using a variac or an adjustable transformer.

2. Connect a VOM between Emitter of X701 and ground.

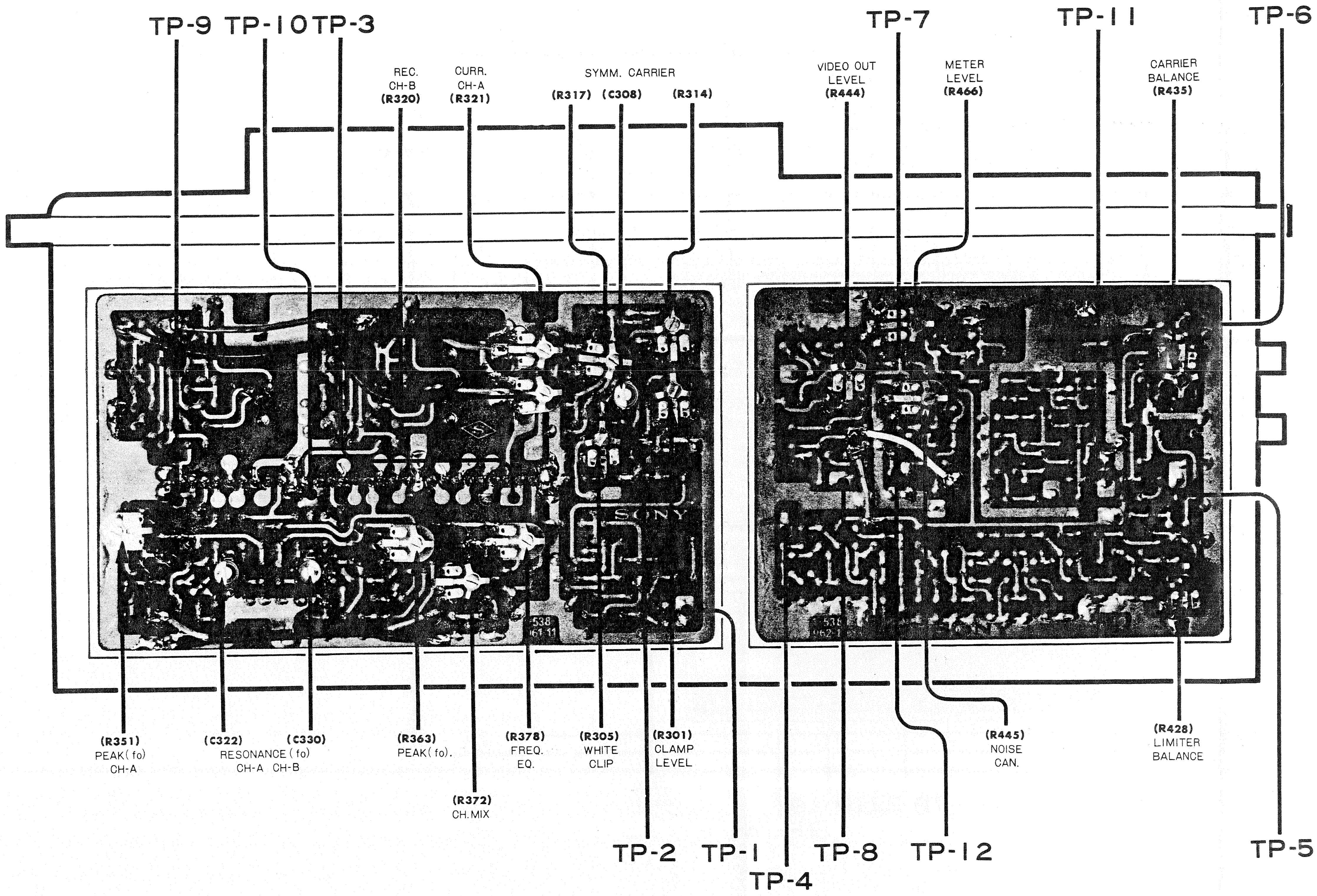
3. Adjust R-541 (B-5K) for a reading of 28 volts D.C.

SECTION 10

ILLUSTRATIONS

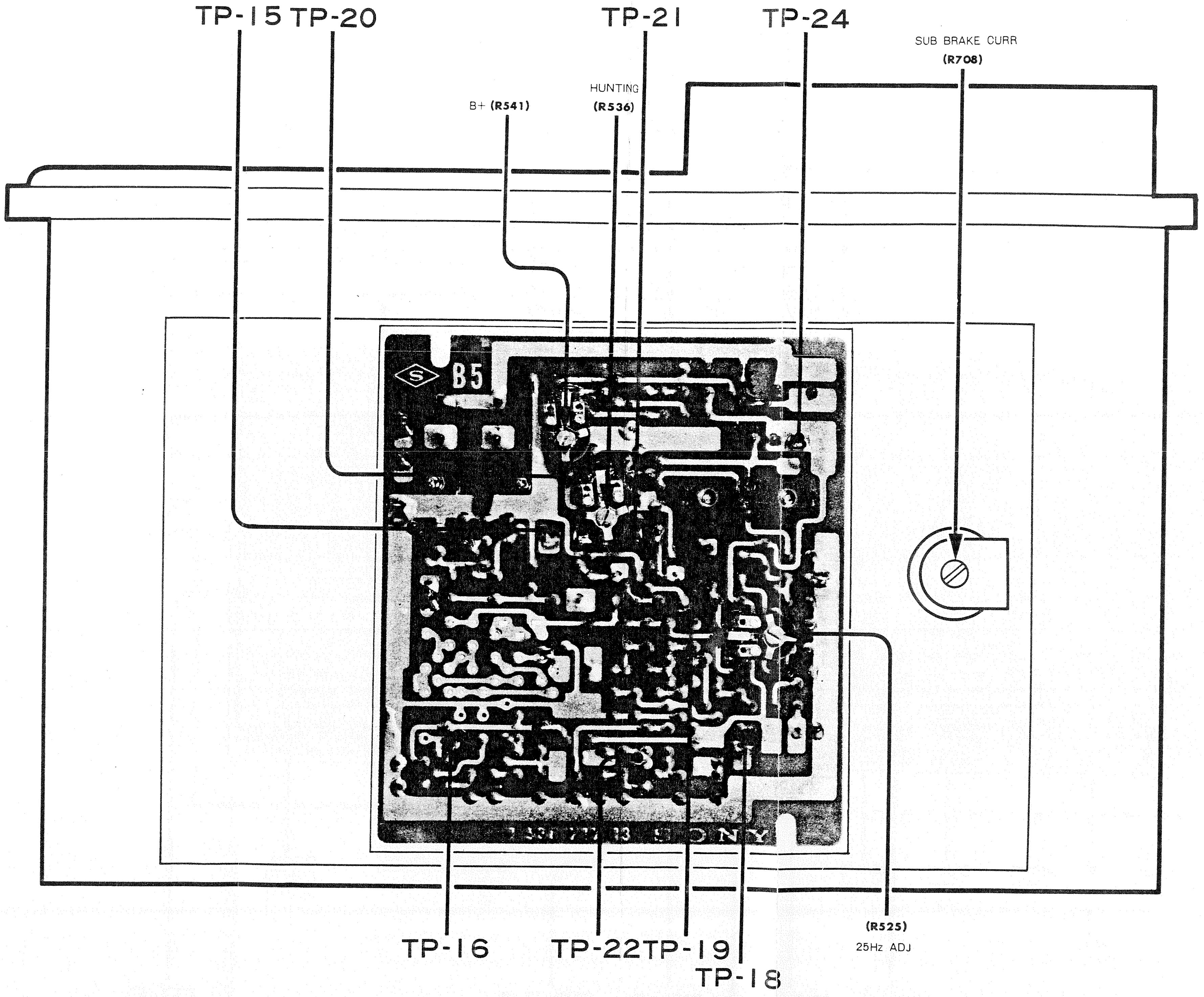
10-1 TEST POINT AND ADJ. GUIDE, CHASSIS FRONT

A11(left), A12(right) circuit board

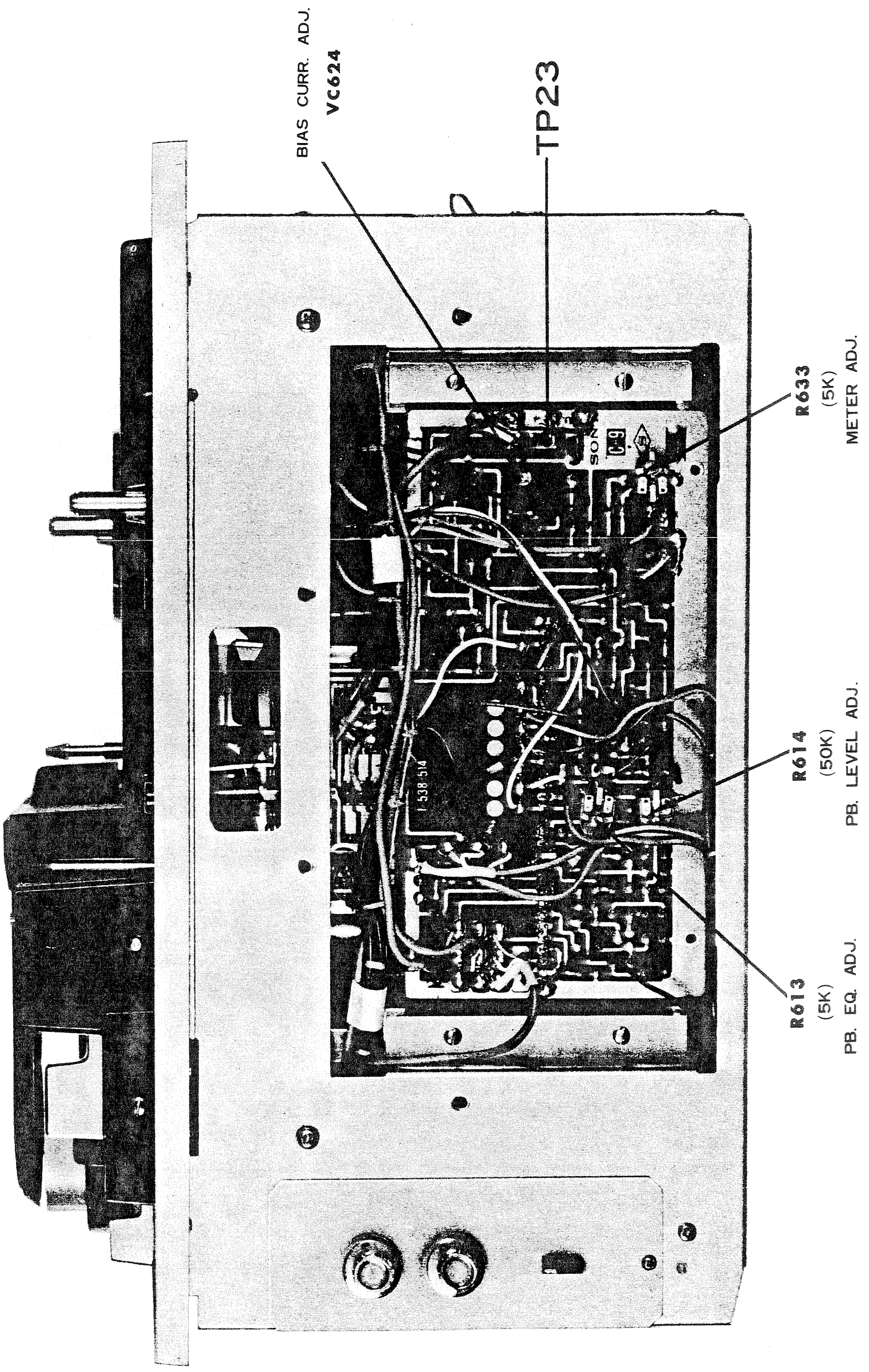

TP-9
TP-10
TP-3
REC. CH-B (R320)
CURR. CH-A (R321)
SYMM. CARRIER
(R317)
(C308)
(R314)
VIDEO OUT LEVEL (R444)
TP-7
METER LEVEL (R466)
TP-11
CARRIER BALANCE (R435)
TP-6
SONY
538 961 11
538 962
(R351) PEAK(fo) CH-A
(C322)
(C330)
RESONANCE(fo) CH-A CH-B
(R363) PEAK(fo).
(R372) CH.MIX
(R378) FREQ. EQ.
(R305) WHITE CLIP
(R301) CLAMP LEVEL
TP-2
TP-1
TP-4
TP-8
TP-12
(R445) NOISE CAN.
(R428) LIMITER BALANCE
TP-5

10-2 TEST POINT AND ADJ. GUIDE, LEFT SIDE

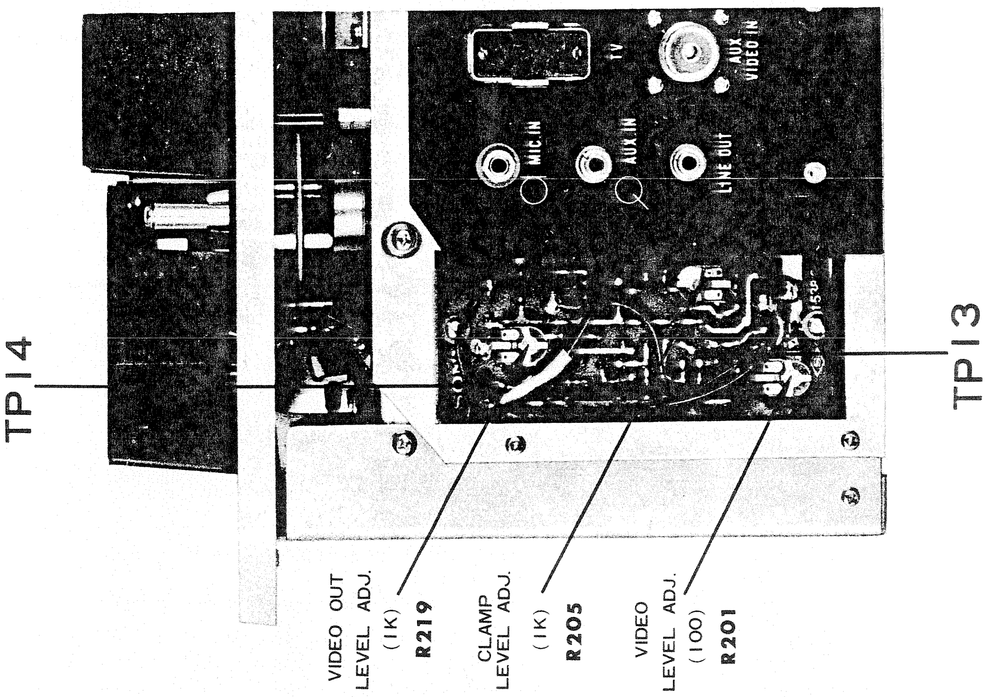
B5 circuit board


TP-15
TP-20
TP-21
TP-24
SUB BRAKE CURR
(R708)
B+ (R541)
HUNTING
(R536)
B5
SONY
TP-16
TP-22
TP-19
TP-18
(R525)
25Hz ADJ

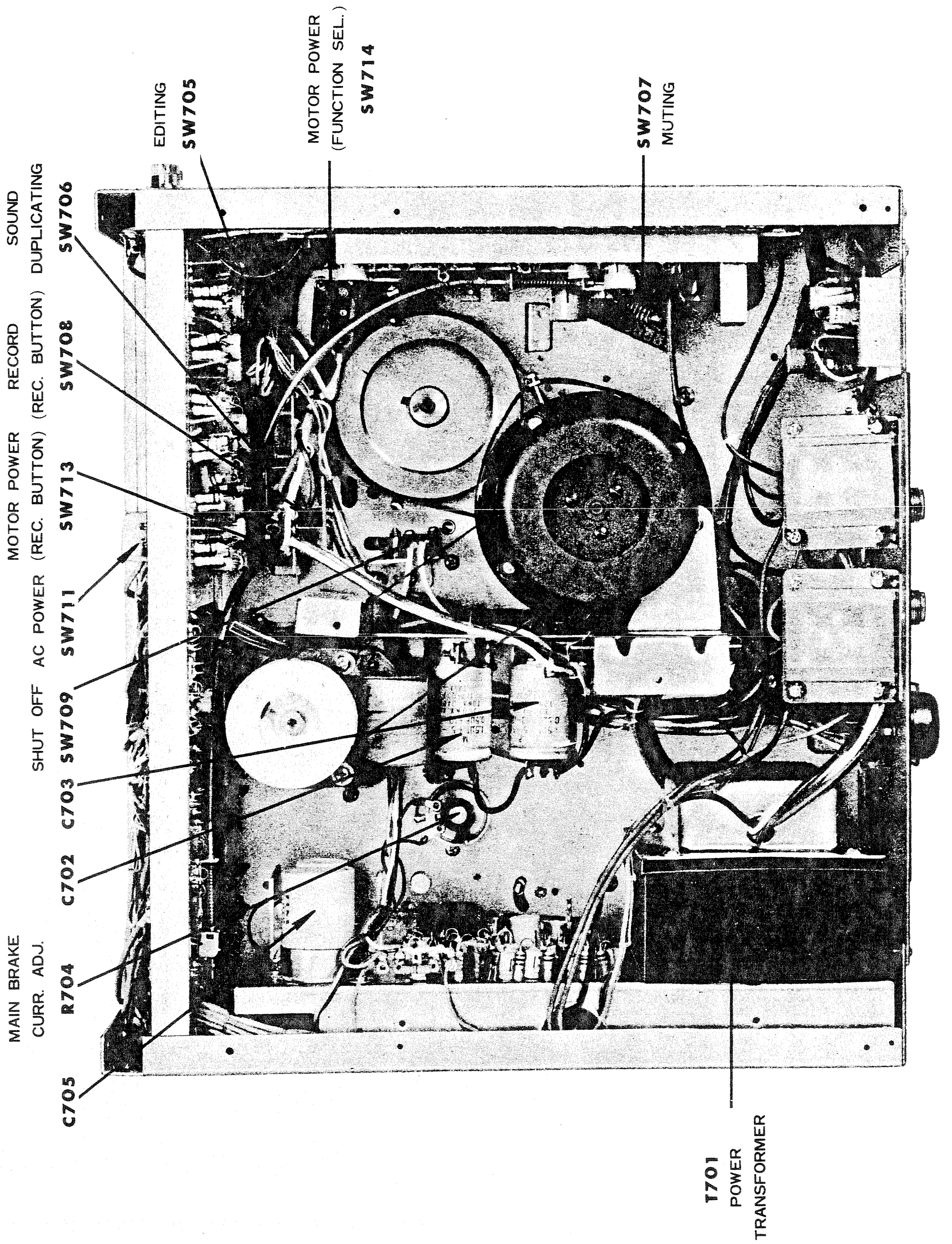
10-3 TEST POINT AND ADJ. GUIDE, RIGHT SIDE


BIAS CURR. ADJ.
VC624
TP23
R633
(5K)
METER ADJ.
R614
(50K)
PB. LEVEL ADJ.
R613
(5K)
PB. EQ. ADJ.
1-538-514
SONY

10-4 TEST POINT AND ADJ. GUIDE, REAR SIDE

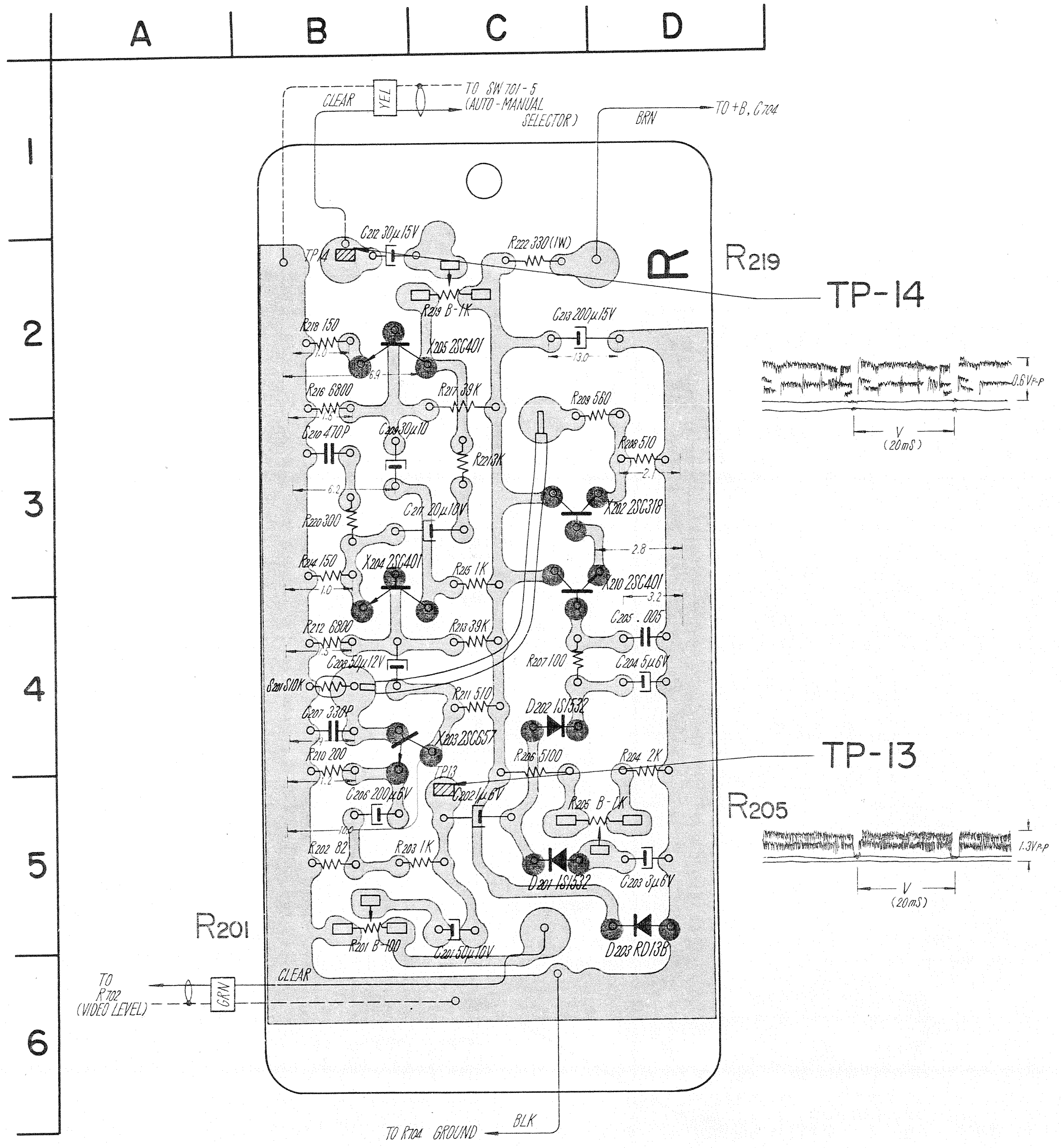

TP14
TP13
TV
AUX VIDEO IN
MIC.IN
AUX.IN
LINE OUT
VIDEO OUT LEVEL ADJ. (1K) R219
CLAMP LEVEL ADJ. (1K) R205
VIDEO LEVEL ADJ. (100) R201

10-5 TEST POINT AND, ADJ. GUIDE, BOTTOM CHASSIS


MAIN BRAKE CURR. ADJ. R704
C705
C702
C703
SHUT OFF SW709
AC POWER SW711
MOTOR POWER (REC. BUTTON) SW713
RECORD (REC. BUTTON) SW708
SOUND DUPLICATING SW706
EDITING SW705
MOTOR POWER (FUNCTION SEL.) SW714
SW707 MUTING
T701 POWER TRANSFORMER

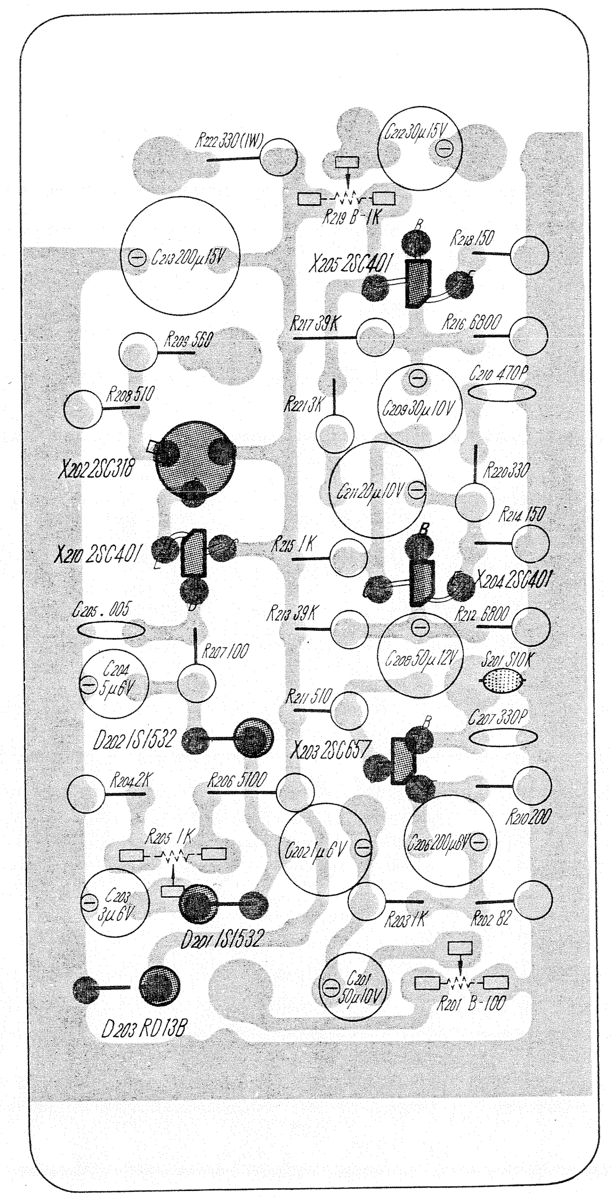
10-6 R CIRCUIT BOARD, CONDUCTOR SIDE

VIDEO AGC

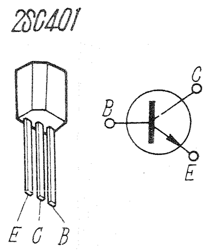

A
B
C
D
1
2
3
4
5
6
CLEAR
YEL
TO SW 701-5 (AUTO-MANUAL SELECTOR)
BRN
TO +B, C704
R
R219
TP-14
TP14
C212 30μ15V
R222 330(1W)
R219 B-1K
C213 200μ15V
13.0
R218 150
1.0
X205 2SC401
6.9
R216 6800
1.5
R217 39K
R209 560
C210 470P
C209 30μ10
R221 3K
R208 510
2.1
6.2
C211 20μ10V
R220 300
X202 2SC318
2.8
R214 150
1.0
X204 2SC401
R215 1K
X210 2SC401
3.2
R212 6800
1.5
R213 39K
C205 .005
C208 50μ12V
R207 100
C204 5μ6V
S201 S10K
R211 510
D202 1S1532
C207 330P
X203 2SC657
R210 200
1.2
R206 5100
R204 2K
TP-13
TP13
C206 200μ6V
C202 1μ6V
R205 B-1K
R205
10.0
R202 82
R203 1K
D201 1S1532
C203 3μ6V
R201
R201 B-100
C201 50μ10V
D203 RD13B
CLEAR
TO R702 (VIDEO LEVEL)
GRN
BLK
TO R704 GROUND
0.6VP-P
V (20mS)
1.3VP-P
V (20mS)

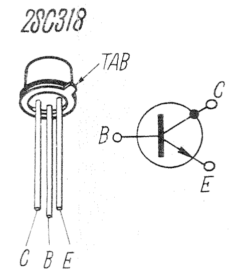
R CIRCUIT BOARD, COMPONENTS SIDE

VIDEO AGC


R222 330(1W)
C212 30μ15V
R219 B-1K
C213 200μ15V
X205 2SC401
R218 150
R217 39K
R216 6800
R209 560
C210 470P
R208 510
R221 3K
C209 30μ10V
X202 2SC318
C211 20μ10V
R220 330
R214 150
X210 2SC401
R215 1K
X204 2SC401
C205 .005
R213 39K
R212 6800
R207 100
C208 50μ12V
S201 S10K
C204 5μ6V
R211 510
C207 330P
D202 1S1532
X203 2SC657
R204 2K
R206 5100
R210 200
R205 1K
C202 1μ6V
C206 200μ6V
C203 3μ6V
D201 1S1532
R203 1K
R202 82
C201 30μ10V
R201 B-100
D203 RD13B
B

* ALL ADJUSTABLE RESISTORS R201 R205 AND R219 ARE MOUNTED ON CONDUCTOR SIDE.

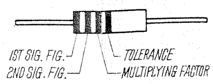

2SC401
B
C
E
E C B


2SC318
TAB
B
C
E
C B E

SYMBOLS CODE

—WW—	RESISTOR
—WW—	ADJUSTABLE RESISTOR
—‖—	CAPACITOR
—▯—	ELECT. CAPACITOR
—▶|—	DIODE
⊗	TRANSISTOR
—(WW)—	THERMISTOR
—ᴥᴥ—	INDUCTOR

COLOUR CORD

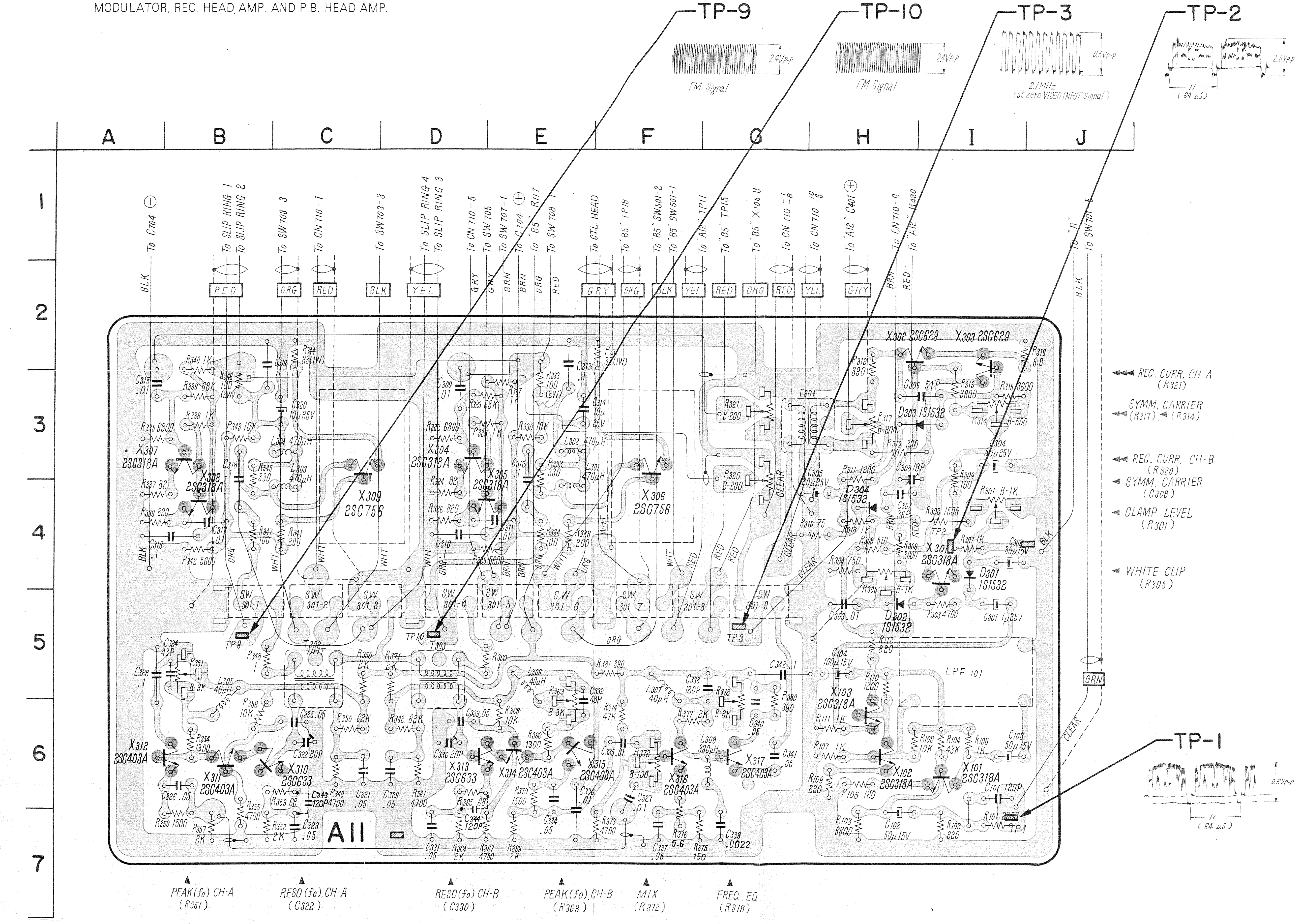

1ST SIG. FIG.
2ND SIG. FIG.
TOLERANCE
MULTIPLYING FACTOR

EXAMPLE
1 ST COLOUR BROWN 1
2ND COLOUR BLACK 0
3RD COLOUR GREEN 10⁵
4TH COLOUR SILVER ±10%
1MΩ ±10%

COLOUR BAND	SIGNIFICANT FIGURE	MULTIPLYING FACTOR	TOLERANCE
BLACK	0	10^0	
BROWN	1	10^1	
RED	2	10^2	±25%
ORANGE	3	10^3	
YELLOW	4	10^4	
GREEN	5	10^5	
BLUE	6	10^6	
VIOLET	7	10^7	
GRAY	8	10^8	
WHITE	9	10^9	
GOLD		10^{-1}	±5%
SILVER		10^{-2}	±10%
NIL			±20%

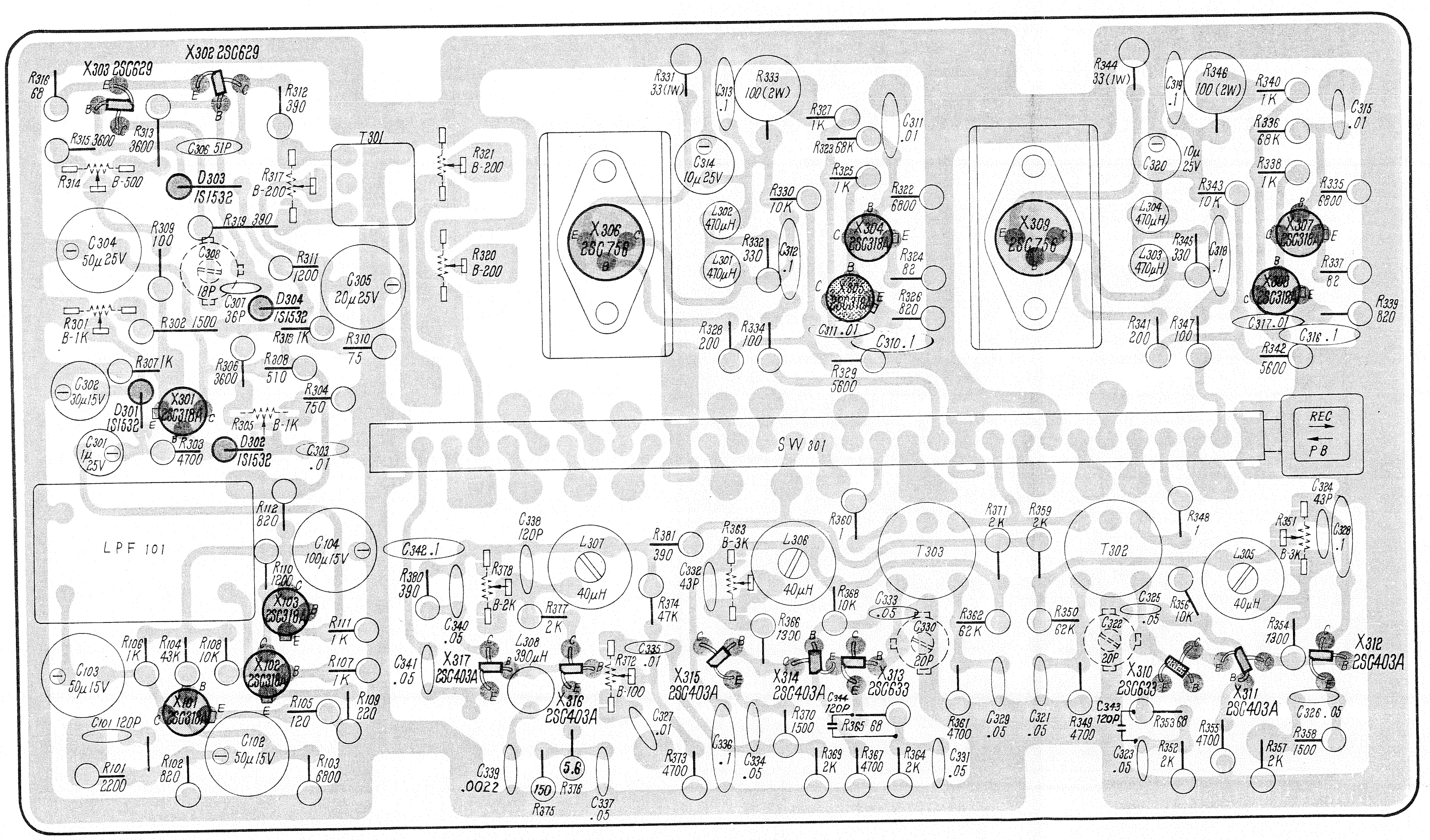
10-7 A11 CIRCUIT BOARD, CONDUCTOR SIDE

MODULATOR, REC. HEAD AMP. AND P.B. HEAD AMP.

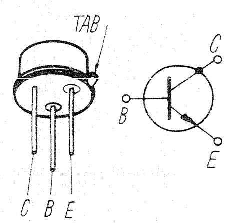

TP-9
2.4Vp-p
FM Signal
TP-10
2.4Vp-p
FM Signal
TP-3
0.5Vp-p
2.1MHz
(at zero VIDEO INPUT Signal)
TP-2
2.5Vp-p
H
(64 μS)
A
B
C
D
E
F
G
H
I
J
1
2
3
4
5
6
7
To C704 ⊖
To SLIP RING 1
To SLIP RING 2
To SW703-3
To CN710-1
To SW703-3
To SLIP RING 4
To SLIP RING 3
To CN710-5
To SW705
To SW707-1
To C704 ⊕
To "B5" R117
To SW708-1
To CTL HEAD
To "B5" TP18
To "B5" SW501-2
To "B5" SW501-1
To "A12" TP11
To "B5" TP15
To "B5" X105 B
To CN710-7
To CN710-8
To CN710-10
To CN710-9
To "A12" C401 ⊕
To CN710-6
To "A12" R480
To "R"
To SW701-6
BLK
RED
ORG
RED
BLK
YEL
GRY
GRY
BRN
BRN
ORG
RED
GRY
ORG
BLK
YEL
RED
ORG
RED
YEL
GRY
BRN
RED
BLK
GRN
WHT
CLEAR
X302 2SC629
X303 2SC629
X307 2SC318A
X308 2SC318A
X309 2SC756
X304 2SC318A
X305 2SC318A
X306 2SC756
X301 2SC318A
X312 2SC403A
X311 2SC403A
X310 2SC633
X313 2SC633
X314 2SC403A
X315 2SC403A
X316 2SC403A
X317 2SC403A
X103 2SC318A
X102 2SC318A
X101 2SC318A
D301 1S1532
D302 1S1532
D303 1S1532
D304 1S1532
T301
T302
T303
LPF 101
SW 301-1
SW 301-2
SW 301-3
SW 301-4
SW 301-5
SW 301-6
SW 301-7
SW 301-8
SW 301-9
TP9
TP10
TP3
TP2
TP1
A11
◀◀◀ REC. CURR, CH-A
(R321)
SYMM, CARRIER
◀◀ (R317), ◀ (R314)
◀◀ REC. CURR. CH-B
(R320)
◀ SYMM. CARRIER
(C308)
◀ CLAMP LEVEL
(R301)
◀ WHITE CLIP
(R305)
TP-1
0.6Vp-p
H
(64 μS)
▲
PEAK(fo) CH-A
(R351)
▲
RESO (fo), CH-A
(C322)
▲
RESO(fo) CH-B
(C330)
▲
PEAK(fo), CH-B
(R363)
▲
MIX
(R372)
▲
FREQ. EQ
(R378)

A11 CIRCUIT BOARD, COMPONENTS SIDE

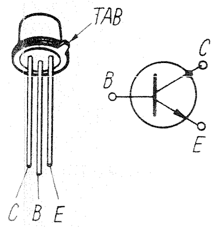
MODULATOR, REC. HEAD AMP. AND P.B. HEAD AMP.


X303 2SC629
X302 2SC629
R316 68
R315 3600
R313 3600
R312 390
R314
B-500
C306 51P
D303 1S1532
R317 B-200
T301
R321 B-200
R320 B-200
R319 390
C304 50μ 25V
R309 100
C308 18P
R311 1200
C305 20μ 25V
C307 36P
D304 1S1532
R301 B-1K
R302 1500
R318 1K
R310 75
R307 1K
R306 3600
R308 510
C302 30μ 15V
D301 1S1532
X301 2SC318A
R305 B-1K
R304 750
C301 1μ 25V
R303 4700
D302 1S1532
C303 .01
R331 33(1W)
C313 .1
R333 100(2W)
R327 1K
R323 68K
C311 .01
C314 10μ 25V
X306 2SC756
R325 1K
R330 10K
R322 6800
L302 470μH
X304 2SC318A
L301 470μH
R332 330
C312 .1
R324 82
X305 2SC318A
R326 820
C311 .01
C310 .1
R328 200
R334 100
R329 5600
R344 33(1W)
C319 .1
R346 100(2W)
R340 1K
C315 .01
R336 68K
C320 10μ 25V
R338 1K
X309 2SC756
R343 10K
R335 6800
L304 470μH
X307 2SC318A
L303 470μH
R345 330
C318 .1
R337 82
X308 2SC318A
R339 820
C317 .01
C316 .1
R341 200
R347 100
R342 5600
SW 301
REC
PB
LPF 101
R112 820
C104 100μ 15V
C342 .1
C338 120P
L307 40μH
R381 390
R383 B-3K
L306 40μH
R360 1
T303
R371 2K
R359 2K
T302
R348 1
C324 43P
R351 B-3K
C328 .1
L305 40μH
R110 1200
X103 2SC318A
R380 390
R378 B-2K
R377 2K
C332 43P
R374 47K
R368 10K
C333 .05
R362 62K
R350 62K
C325 .05
R356 10K
R111 1K
C340 .05
L308 390μH
R366 1300
C330 20P
C322 20P
R354 1300
X312 2SC403A
R106 1K
R104 43K
R108 10K
X102 2SC318A
R107 1K
C341 .05
X317 2SC403A
R372 B-100
C335 .01
X315 2SC403A
X314 2SC403A
X313 2SC633
X310 2SC633
X311 2SC403A
C103 50μ 15V
R105 120
R109 220
X316 2SC403A
C327 .01
C344 120P
R370 1500
R365 68
R361 4700
C329 .05
C321 .05
R349 4700
C343 120P
R353 68
R355 4700
C326 .05
C101 120P
X101 2SC318A
C102 50μ 15V
C336 .1
C334 .05
R373 4700
R369 2K
R367 4700
R364 2K
C331 .05
C323 .05
R352 2K
R357 2K
R358 1500
R101 2200
R102 820
R103 6800
C339 .0022
R375 150
R376 5.6
C337 .05
E
B
C

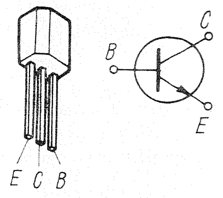
2SC756



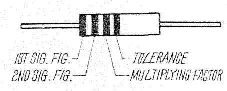
2SC318A



2SC633
2SC629
2SC401A
2SC403A



COLOUR CORD

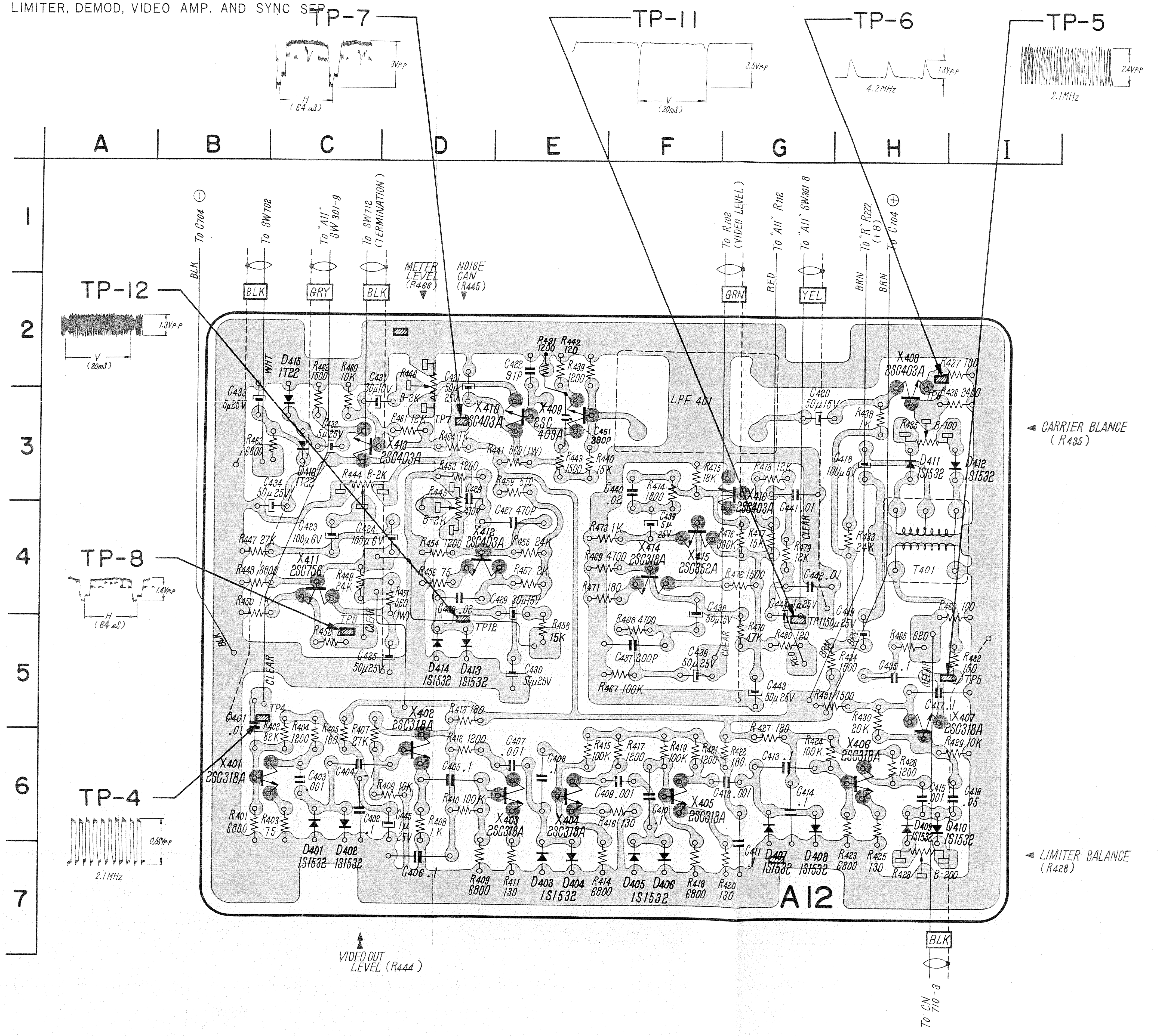

1ST SIG. FIG.
2ND SIG. FIG.
TOLERANCE
MULTIPLYING FACTOR

EXAMPLE
1 ST COLOUR BROWN 1
2ND COLOUR BLACK 0
3RD COLOUR GREEN 10⁵
4TH COLOUR SILVER ± 10%
1MΩ ± 10%

COLOUR BAND	SIGNIFICANT FIGURE	MULTIPLYING FACTOR	TOLERANCE
BLACK	0	10^0	
BROWN	1	10^1	
RED	2	10^2	±25%
ORANGE	3	10^3	
YELLOW	4	10^4	
GREEN	5	10^5	
BLUE	6	10^6	
VIOLET	7	10^7	
GRAY	8	10^8	
WHITE	9	10^9	
GOLD		10^{-1}	±5%
SILVER		10^{-2}	±10%
NIL			±20%

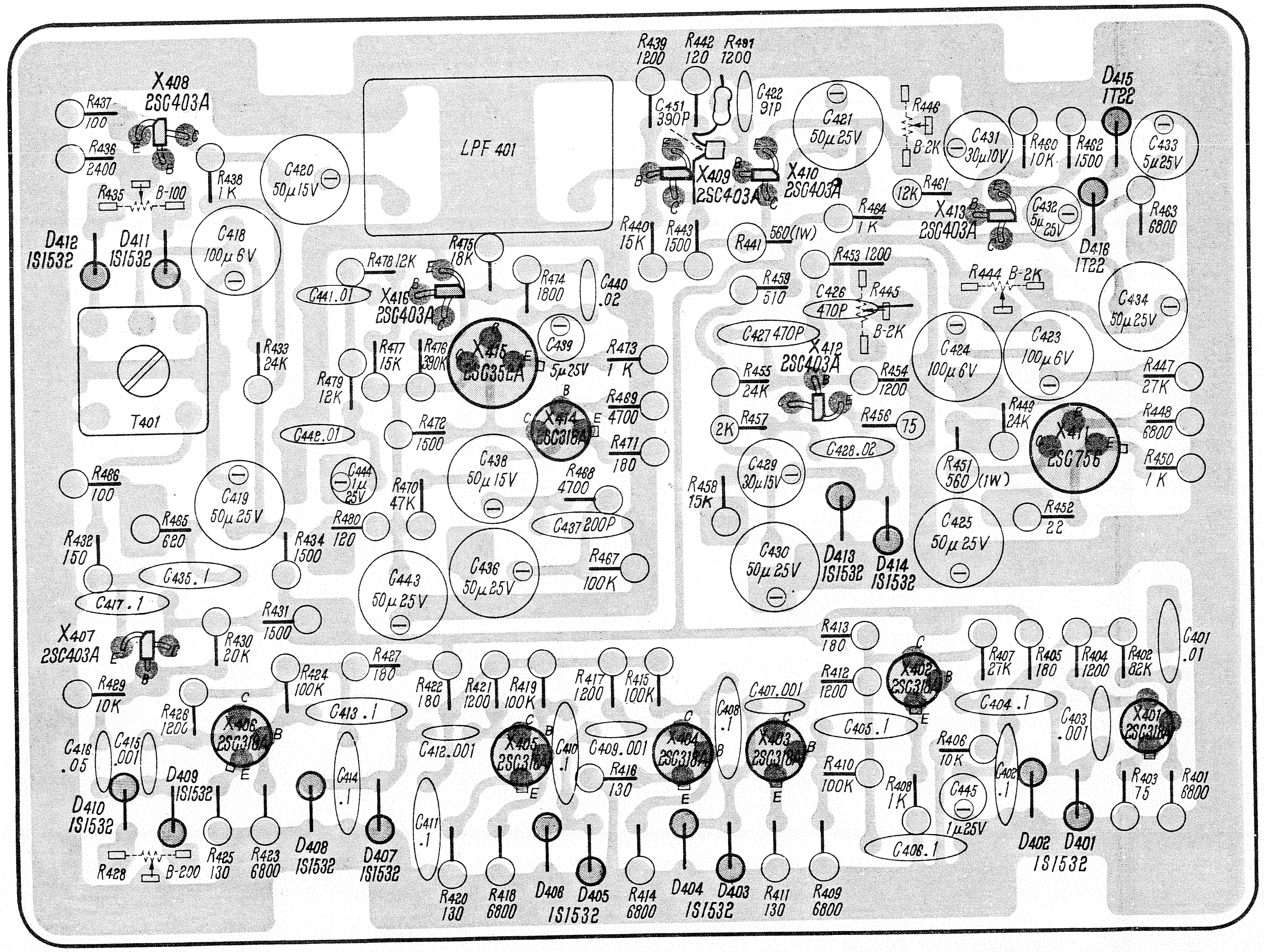
10-8 A12 CIRCUIT BOARD, CONDUCTOR SIDE

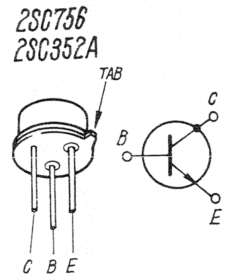
LIMITER, DEMOD, VIDEO AMP. AND SYNC SEP.

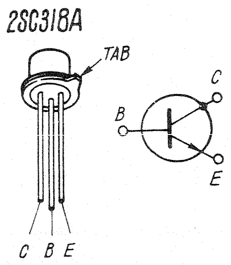

TP-7
3Vp-p
H (64 µS)
TP-11
3.5Vp-p
V (20mS)
TP-6
1.3Vp-p
4.2MHz
TP-5
2.4Vp-p
2.1MHz
A
B
C
D
E
F
G
H
I
1
2
3
4
5
6
7
TP-12
1.3Vp-p
V (20mS)
TP-8
1.4Vp-p
H (64 µS)
TP-4
0.98Vp-p
2.1MHz
To C704 ⊖
To SW702
To "A11" SW 301-9
To SW712 (TERMINATION)
METER LEVEL (R468)
NOISE CAN (R445)
To R702 (VIDEO LEVEL)
To "A11" R112
To "A11" SW301-8
To "R" R222 (+B)
To C704 ⊕
BLK
GRY
GRN
RED
YEL
BRN
WHT
CLEAR
LPF 401
T401
X401 2SC318A
X402 2SC318A
X403 2SC318A
X404 2SC318A
X405 2SC318A
X406 2SC318A
X407 2SC318A
X408 2SC403A
X409 2SC403A
X410 2SC403A
X411 2SC756
X412 2SC403A
X413 2SC403A
X414 2SC318A
X415 2SC352A
X416 2SC403A
D401 D402 1S1532
D403 D404 1S1532
D405 D406 1S1532
D407 D408 1S1532
D409 1S1532
D410 1S1532
D411 1S1532
D412 1S1532
D413 D414 1S1532
D415 1T22
D416 1T22
CARRIER BLANCE (R435)
LIMITER BALANCE (R428)
VIDEO OUT LEVEL (R444)
To CN 710-3
A12

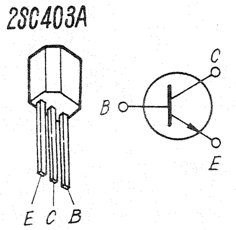
A12 CIRCUIT BOARD, COMPONENTS SIDE

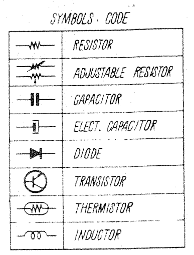
LIMITER, DEMOD, VIDEO AMP. AND SYNC SEP.


X408
2SC403A
R437 100
R436 2400
R435 B-100
R438 1K
C420 50μ15V
LPF 401
R439 1200
R442 120
R491 1200
C451 390P
C422 91P
C421 50μ25V
R446 B 2K
C431 30μ10V
R480 10K
R462 1500
D415 1T22
C433 5μ25V
X409 2SC403A
X410 2SC403A
R461 12K
X413 2SC403A
C432 5μ 25V
R463 6800
D418 1T22
D412 1S1532
D411 1S1532
C418 100μ6V
R478 12K
R475 18K
R474 1800
C440 .02
R440 15K
R443 1500
R441 560(1W)
R464 1K
R453 1200
R444 B-2K
C434 50μ25V
C441 .01
X416 2SC403A
R459 510
C426 470P
R445 B-2K
T401
R433 24K
R477 15K
R476 390K
X415 2SC352A
C439 5μ25V
R473 1K
C427 470P
X412 2SC403A
C424 100μ6V
C423 100μ6V
R447 27K
R479 12K
R455 24K
R454 1200
R449 24K
X411 2SC756
R448 6800
C442 .01
R472 1500
X414 2SC318A
R489 4700
R471 180
R457 2K
R456 75
C428 .02
R450 1K
C438 50μ15V
C444 1μ 25V
R470 47K
R468 4700
C429 30μ15V
R458 15K
R451 560 (1W)
R486 100
C419 50μ25V
R480 120
C437 200P
R452 22
R465 620
R434 120 1500
C425 50μ25V
R432 150
C443 50μ25V
C436 50μ25V
R467 100K
C430 50μ25V
D413 1S1532
D414 1S1532
C435 .1
C417 .1
R431 1500
X407 2SC403A
R430 20K
R424 100K
R427 180
R413 180
R407 27K
R405 180
R404 1200
R402 82K
C401 .01
R429 10K
R426 1200
X406 2SC318A
C413 .1
R422 180
R421 1200
R419 100K
R417 1200
R415 100K
C408 .1
C407 .001
R412 1200
X402 2SC318A
C404 .1
C403 .001
X401 2SC318A
C416 .05
C415 .001
C412 .001
X405 2SC318A
C410 .1
C409 .001
X404 2SC318A
X403 2SC318A
C405 .1
R406 10K
C402 .1
D410 1S1532
D409 1S1532
C414 .1
R416 130
R410 100K
R408 1K
C445 1μ25V
R403 75
R401 6800
C411 .1
C406 .1
D402
D401
1S1532
R428 B-200
R425 130
R423 6800
D408 1S1532
D407 1S1532
R420 130
R418 6800
D406
D405
1S1532
R414 6800
D404
D403
1S1532
R411 130
R409 6800
B
C
E

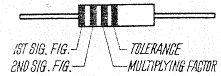

2SC756
2SC352A
TAB
C
B
E
C B E


2SC318A
TAB
C
B
E
C B E


2SC403A
C
B
E
E C B


SYMBOLS · CODE
RESISTOR
ADJUSTABLE RESISTOR
CAPACITOR
ELECT. CAPACITOR
DIODE
TRANSISTOR
THERMISTOR
INDUCTOR

COLOUR CORD

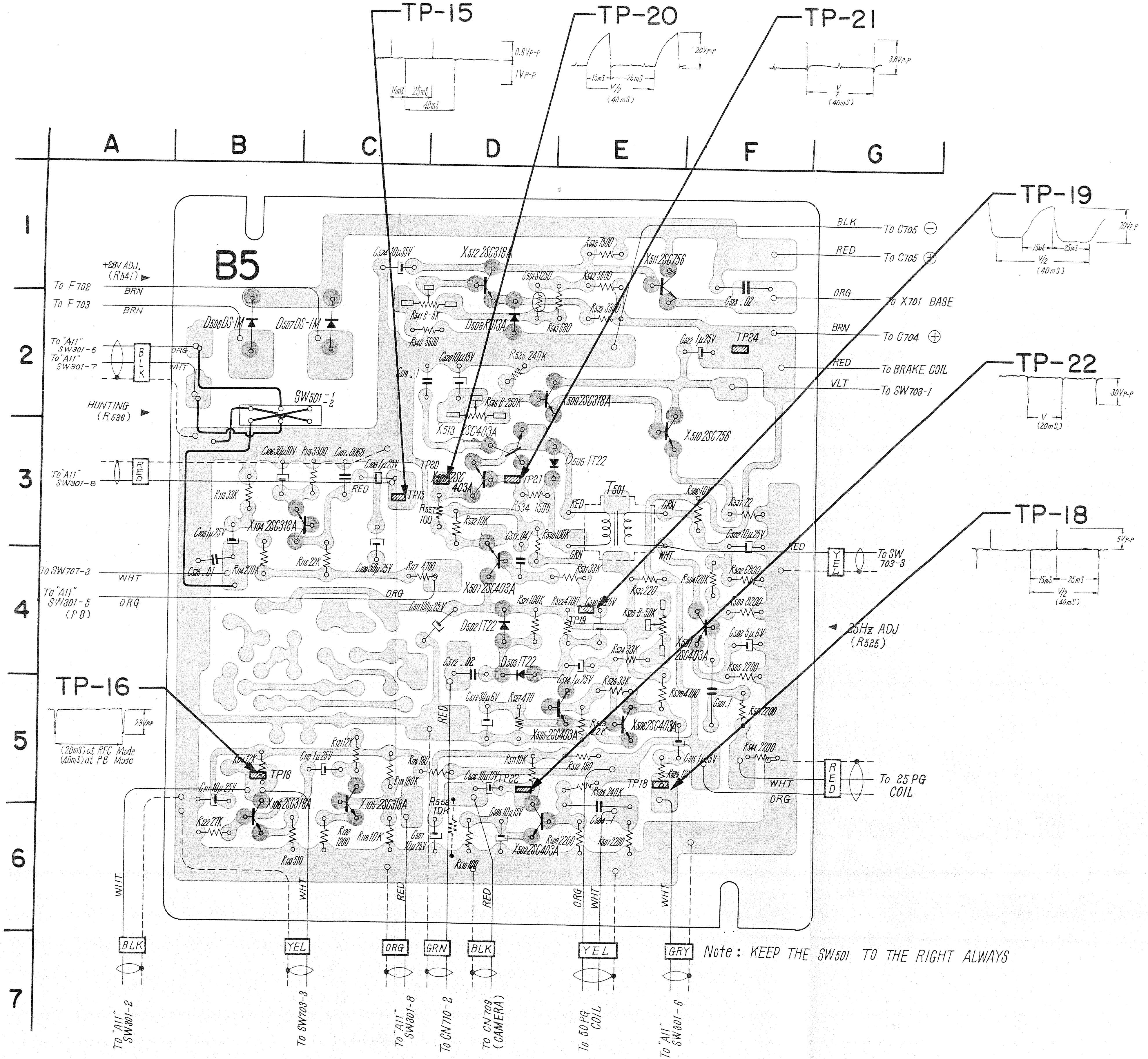

1ST SIG. FIG.
2ND SIG. FIG.
TOLERANCE
MULTIPLYING FACTOR

EXAMPLE
1 ST COLOUR BROWN 1
2ND COLOUR BLACK 0
3RD COLOUR GREEN 10^5
4TH COLOUR SILVER ±10%
1MΩ±10%

COLOUR BAND	SIGNIFICANT FIGURE	MULTIPLYING FACTOR	TOLERANCE
BLACK	0	10^0	
BROWN	1	10^1	
RED	2	10^2	±25%
ORANGE	3	10^3	
YELLOW	4	10^4	
GREEN	5	10^5	
BLUE	6	10^6	
VIOLET	7	10^7	
GRAY	8	10^8	
WHITE	9	10^9	
GOLD		10^{-1}	±5%
SILVER		10^{-2}	±10%
NIL			±20%

10-9 B5 CIRCUIT BOARD, CONDUCTOR SIDE

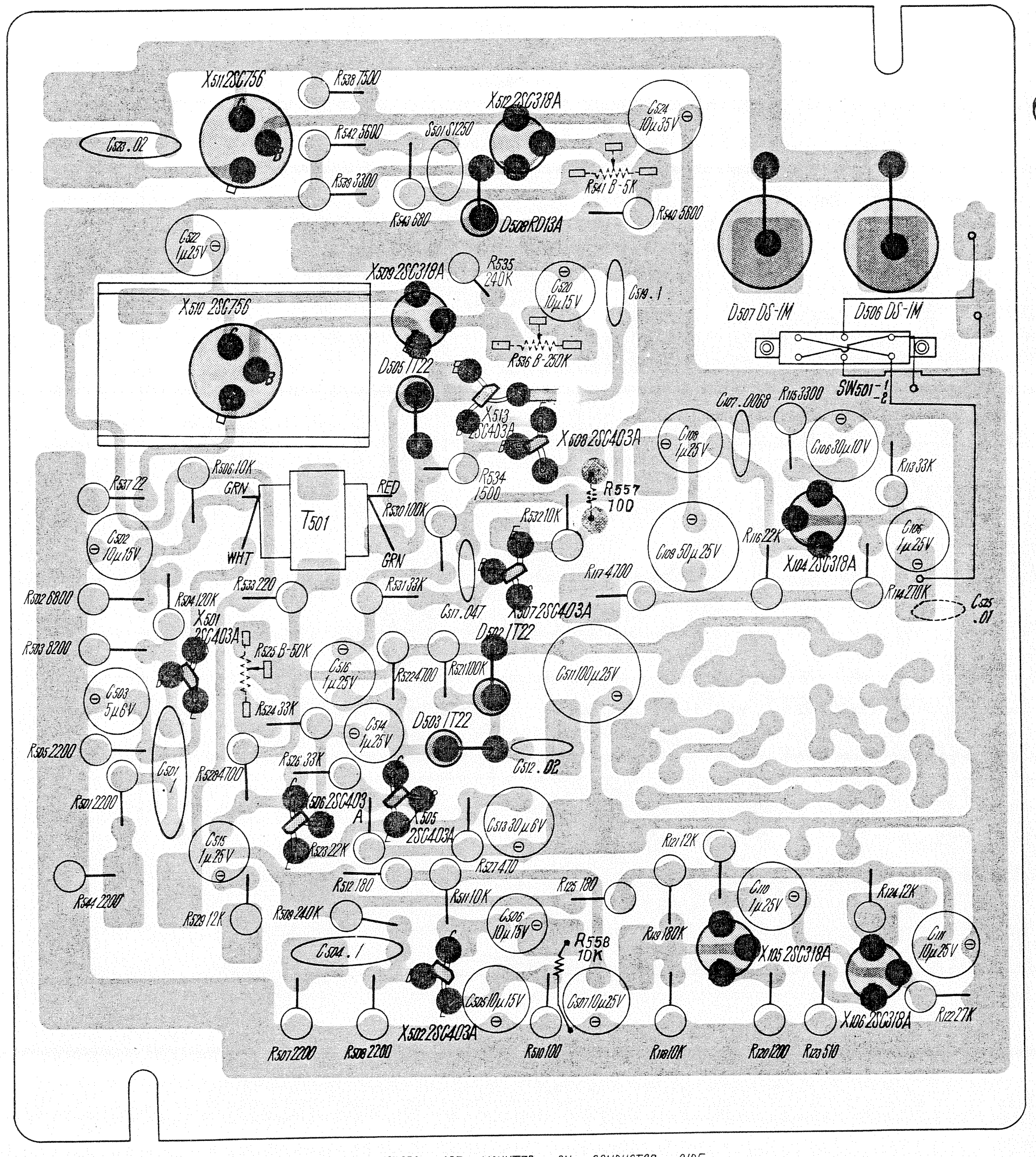
SERVO AMP., PULSE AMP. AND VOLTAGE REGULATOR


TP-15
0.8Vp-p
1Vp-p
15mS
25mS
40mS
TP-20
20Vp-p
15mS
25mS
V/2 (40mS)
TP-21
3.8Vp-p
V/2 (40mS)
TP-19
20Vp-p
15mS
25mS
V/2 (40mS)
TP-22
30Vp-p
V (20mS)
TP-18
5Vp-p
15mS
25mS
V/2 (40mS)
TP-16
28Vp-p
(20mS) at REC Mode
(40mS) at PB Mode
A
B
C
D
E
F
G
1
2
3
4
5
6
7
B5
+28V ADJ. (R541)
To F702
To F703
BRN
To "A11" SW301-6
To "A11" SW301-7
BLK
HUNTING (R536)
SW501-1/2
To "A11" SW301-8
RED
To SW707-3
WHT
To "A11" SW301-5 (PB)
ORG
D506 DS-1M
D507 DS-1M
X512 2SC318A
X511 2SC756
X509 2SC318A
X510 2SC756
X513 2SC403A
X504 2SC318A
X507 2SC403A
X501 2SC403A
X508 2SC403A
X506 2SC403A
X502 2SC403A
X106 2SC318A
X105 2SC318A
D508 RD13A
D505 1T22
D502 1T22
D503 1T22
T501
TP15
TP16
TP18
TP19
TP20
TP21
TP22
TP24
BLK
To C705 ⊖
RED
To C705 ⊕
ORG
To X701 BASE
BRN
To C704 ⊕
RED
To BRAKE COIL
VLT
To SW703-1
YEL
To SW 703-3
25Hz ADJ (R525)
RED
WHT
ORG
To 25 PG COIL
BLK
YEL
ORG
GRN
BLK
YEL
GRY
To "A11" SW301-2
To SW723-3
To "A11" SW301-8
To CN710-2
To CN709 (CAMERA)
To 50 PG COIL
To "A11" SW301-6

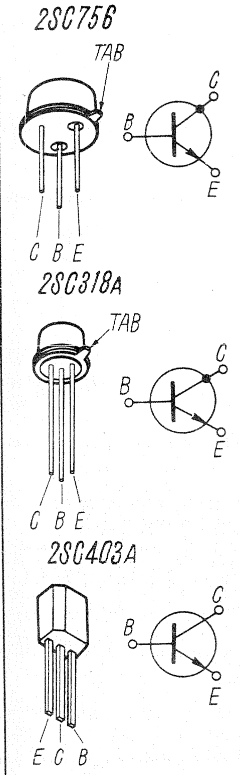
Note: KEEP THE SW501 TO THE RIGHT ALWAYS

B5 CIRCUIT BOARD, COMPONENTS SIDE

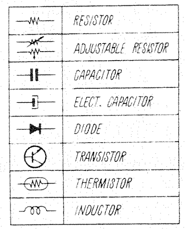
SERVO AMP., PULSE AMP. AND VOLTAGE REGULATOR


X511 2SC756
R538 7500
R542 5600
R539 3300
C523 .02
S501 S1250
R543 680
X512 2SC318A
C524 10µ35V
R541 B-5K
R540 5600
D508 RD13A
C522 1µ25V
X509 2SC318A
R535 240K
C520 10µ15V
C519 .1
R536 B-250K
D507 DS-1M
D506 DS-1M
SW501-1-2
X510 2SC756
D505 1T22
X513 2SC403A
X508 2SC403A
R557 100
C107 .0068
R115 3300
C108 1µ25V
C106 30µ10V
R113 33K
R537 22
R506 10K
GRN
RED
T501
WHT
GRN
R534 1500
R530 100K
R532 10K
C502 10µ15V
C109 50µ25V
R116 22K
X104 2SC318A
C105 1µ25V
R117 4700
R114 270K
C525 .01
R502 6800
R504 120K
R533 220
R531 33K
C517 .047
X507 2SC403A
X501 2SC403A
D502 1T22
R503 8200
R525 B-50K
C516 1µ25V
R522 4700
R521 100K
C511 100µ25V
C503 5µ6V
R524 33K
C514 1µ25V
D503 1T22
R505 2200
C501 .1
R526 33K
C512 .02
R528 4700
R501 2200
X506 2SC403A
X505 2SC403A
C513 30µ6V
C515 1µ25V
R523 22K
R527 470
R121 12K
R512 180
R125 180
R511 10K
C110 1µ25V
R124 12K
R544 2200
R529 12K
R509 240K
C506 10µ15V
R558 10K
R119 180K
X105 2SC318A
C111 10µ25V
C504 .1
C505 10µ15V
C507 10µ25V
X106 2SC318A
R122 27K
X502 2SC403A
R507 2200
R508 2200
R510 100
R118 10K
R120 1200
R123 510

* ALL ADJUSTABLE RESISTORS ARE MOUNTED ON CONDUCTOR SIDE.

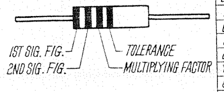

2SC756
TAB
C
B
E
C B E
2SC318A
TAB
C
B
E
C B E
2SC403A
C
B
E
E C B

SYMBOLS CODE



—\/\/\/—	RESISTOR
	ADJUSTABLE RESISTOR
—||—	CAPACITOR
	ELECT. CAPACITOR
—▶|—	DIODE
	TRANSISTOR
	THERMISTOR
	INDUCTOR

COLOUR CORD

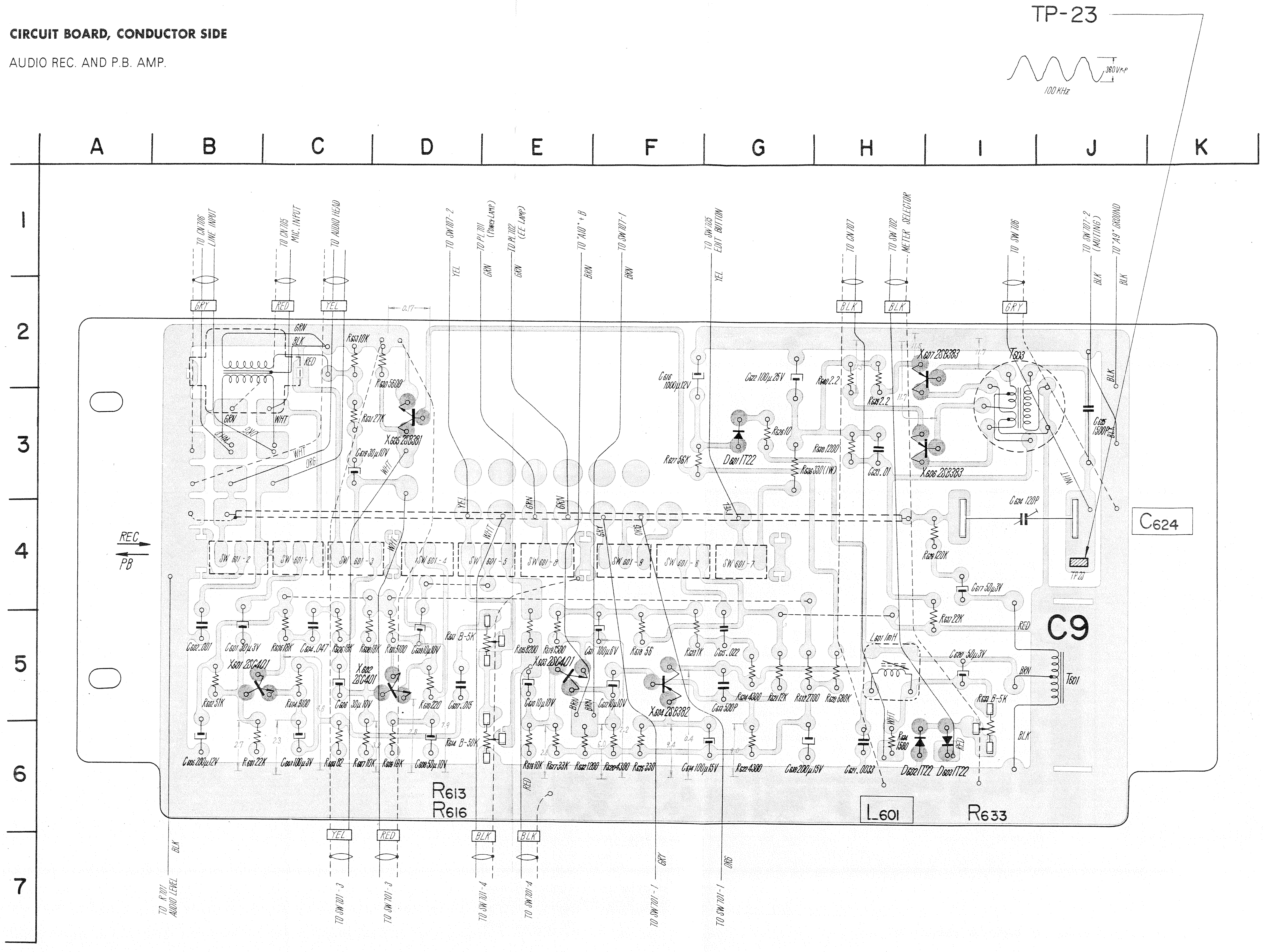

1ST SIG. FIG.
2ND SIG. FIG.
TOLERANCE
MULTIPLYING FACTOR

EXAMPLE
1 ST COLOUR BROWN 1
2ND COLOUR BLACK 0
3RD COLOUR GREEN 10⁵
4TH COLOUR SILVER ±10%
1MΩ±10%

COLOUR BAND	SIGNIFICANT FIGURE	MULTIPLYING FACTOR	TOLERANCE
BLACK	0	10^0	
BROWN	1	10^1	
RED	2	10^2	±25%
ORANGE	3	10^3	
YELLOW	4	10^4	
GREEN	5	10^5	
BLUE	6	10^6	
VIOLET	7	10^7	
GRAY	8	10^8	
WHITE	9	10^9	
GOLD		10^{-1}	±5%
SILVER		10^{-2}	±10%
NIL			±20%

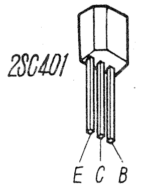
10-10 C9 CIRCUIT BOARD, CONDUCTOR SIDE

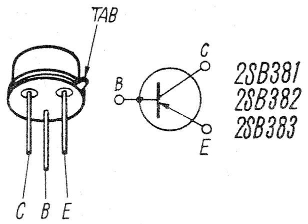
AUDIO REC. AND P.B. AMP.


TP-23
360Vp-p
100KHz
A
B
C
D
E
F
G
H
I
J
K
1
2
3
4
5
6
7
TO CN706 LINE INPUT
TO CN705 MIC. INPUT
TO AUDIO HEAD
TO SW707-2
TO PL701 (Power LAMP)
TO PL702 (EE LAMP)
TO "A10" +B
TO SW707-1
TO SW705 EDIT BUTTON
TO CN707
TO SW702 METER SELECTOR
TO SW706
TO SW707-2 (MUTING)
TO "A9" GROUND
GRY
RED
YEL
BLK
BLK
GRY
YEL
GRN
GRN
BRN
BRN
YEL
BLK
BLK
0.17
GRN
BLK
RED
GRN
WHT
WHT
ORG
WHT
R653 10K
R630 5600
R631 27K
X605 2SB381
C619 30µ10V
C616 1000µ12V
C622 100µ25V
R640 2.2
R639 2.2
X607 2SB383
T603
R626 10
R627 56K
D601 1T22
R638 1200
R636 330(1W)
C623 .01
X606 2SB383
C625 1500P
C624 120P
C624
R629 120K
TP23
C617 50µ3V
R637 22K
C9
REC
PB
SW601-2
SW601-1
SW601-3
SW601-4
SW601-5
SW601-8
SW601-9
SW601-6
SW601-7
YEL
WHT
GRN
GRN
GRY
ORG
YEL
WHT
C602 .001
C601 30µ3V
R605 18K
C604 .047
R606 18K
R608 18K
R611 5100
C609 10µ10V
R613 B-5K
R615 8200
R619 1500
C611 100µ6V
R618 56
R623 1K
C615 .022
L601 1mH
C620 50µ3V
BRN
T601
X601 2SC401
R602 51K
R604 9100
X602 2SC401
C606 30µ10V
R610 220
C607 .015
X603 2SC401
C610 10µ10V
BRN
BRN
C612 10µ10V
X604 2SB382
C613 500P
R624 4300
R621 12K
R612 2700
R628 680K
R633 B-5K
WHT
R634 1500
RED
BLK
C605 200µ12V
R601 22K
C603 100µ3V
R603 82
R607 10K
R609 18K
C608 50µ10V
R614 B-50K
R616 10K
R617 33K
R632 1200
R620 4300
R625 330
C614 100µ15V
R622 4300
C618 200µ15V
C621 .0033
D602 1T22
D603 1T22
R613
R616
RED
L601
R633
YEL
RED
BLK
BLK
BLK
GRY
ORG
TO R701 AUDIO LEVEL
TO SW701-3
TO SW701-3
TO SW701-4
TO SW701-4
TO SW701-1
TO SW701-1

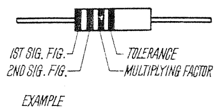
C9 CIRCUIT BOARD, COMPONENTS SIDE

AUDIO REC. AND P.B. AMP.


2SC401
B
C
E
E C B


TAB
B
C
E
C B E
2SB381
2SB382
2SB383

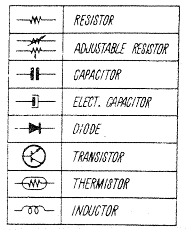
COLOUR CORD

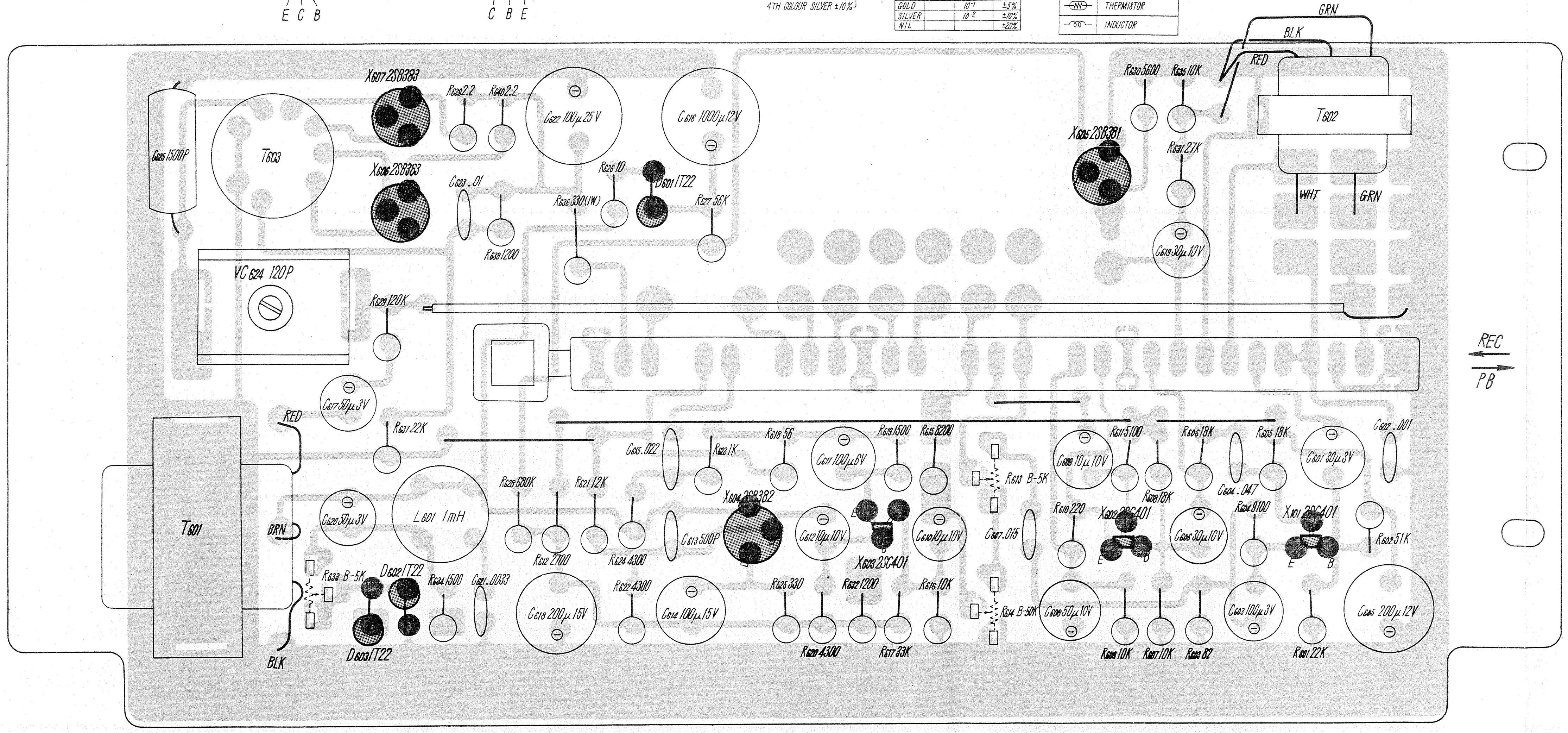

1ST SIG. FIG.
2ND SIG. FIG.
TOLERANCE
MULTIPLYING FACTOR

EXAMPLE
1 ST COLOUR BROWN 1
2ND COLOUR BLACK 0
3RD COLOUR GREEN 10⁵
4TH COLOUR SILVER ±10%
1MΩ±10%

COLOUR BAND	SIGNIFICANT FIGURE	MULTIPLYING FACTOR	TOLERANCE
BLACK	0	10^0	
BROWN	1	10^1	
RED	2	10^2	±25%
ORANGE	3	10^3	
YELLOW	4	10^4	
GREEN	5	10^5	
BLUE	6	10^6	
VIOLET	7	10^7	
GRAY	8	10^8	
WHITE	9	10^9	
GOLD		10^{-1}	±5%
SILVER		10^{-2}	±10%
NIL			±20%

SYMBOLS CODE

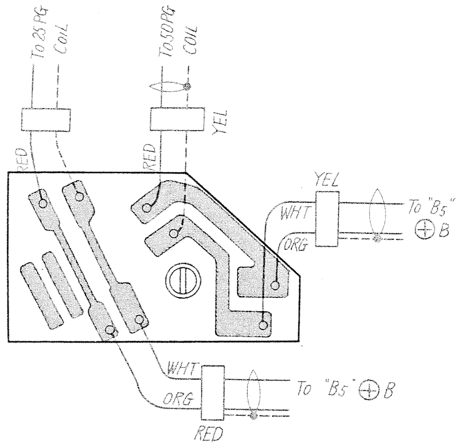

RESISTOR
ADJUSTABLE RESISTOR
CAPACITOR
ELECT. CAPACITOR
DIODE
TRANSISTOR
THERMISTOR
INDUCTOR


X607 2SB383
R639 2.2
R640 2.2
C622 100μ 25V
C616 1000μ 12V
C625 1500P
T603
X606 2SB383
C623 .01
R626 10
D601 1T22
R636 330(1W)
R627 56K
R638 1200
VC624 120P
R629 120K
C617 50μ 3V
RED
R637 22K
T601
BRN
BLK
C620 50μ 3V
L601 1mH
R633 B-5K
D602 1T22
D603 1T22
R634 1500
C621 .0033
R628 680K
R621 12K
R612 2700
R624 4300
C618 200μ 15V
R622 4300
C614 100μ 15V
C615 .022
R623 1K
C613 500P
X604 2SB382
R618 56
C611 100μ 6V
R619 1500
R615 8200
C612 10μ 10V
X603 2SC401
C610 10μ 10V
R625 330
R632 1200
R616 10K
R620 4300
R617 33K
R613 B-5K
C607 .015
R614 B-50K
C608 10μ 10V
R611 5100
R606 18K
R605 18K
C601 30μ 3V
C602 .001
R608 18K
C604 .047
R610 220
X602 2SC401
C606 30μ 10V
R604 9100
X601 2SC401
E
B
R602 51K
C606 50μ 10V
C603 100μ 3V
C605 200μ 12V
R609 10K
R607 10K
R603 82
R601 22K
R630 5600
R635 10K
X605 2SB381
R631 27K
C619 30μ 10V
GRN
BLK
RED
T602
WHT
GRN
REC
PB

* ALL ADJUSTABLE RESISTORS ARE MOUNTED ON CONDUCTOR SIDE

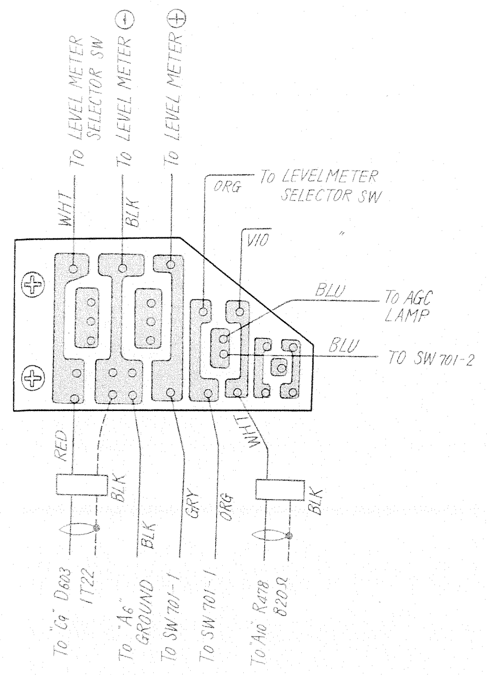
10-11 B1 CIRCUIT BOARD

PG COIL LEAD WIRE JUNCTION


To 25 PG Coil
To 50 PG COIL
YEL
RED
RED
YEL
WHT
ORG
To "B5" ⊕B
WHT
ORG
RED
To "B5" ⊕B

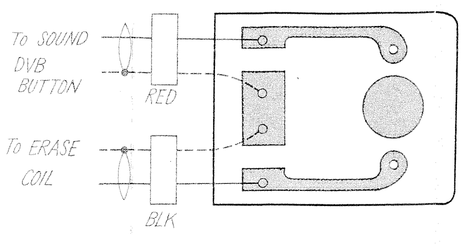
10-12 B2 CIRCUIT BOARD

LEVEL INDICATOR WIRE JUNCTION


To LEVEL METER SELECTOR SW
To LEVEL METER ⊖
To LEVEL METER ⊕
WHT
BLK
ORG
To LEVELMETER SELECTOR SW
VIO
BLU
To AGC LAMP
BLU
TO SW 701-2
RED
BLK
BLK
GRY
ORG
WHT
BLK
To "C9" D603 1T22
To "A6" GROUND
To SW 701-1
To SW 701-1
To "A10" R478 820Ω

10-13 B3 CIRCUIT BOARD

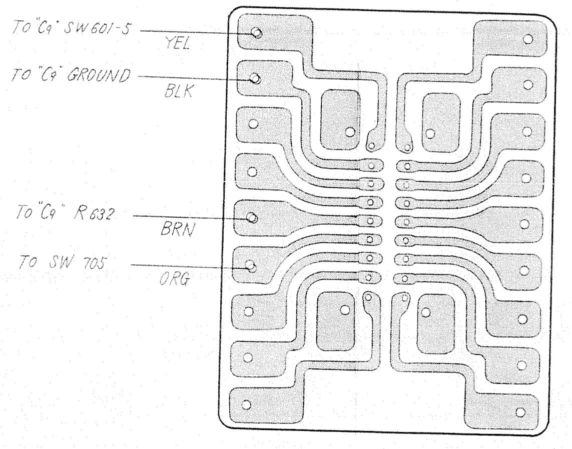
DUMMY COIL MOUNTING


To SOUND DVB BUTTON
RED
To ERASE COIL
BLK

(DUMMY COIL)

10-14 N1 CIRCUIT BOARD

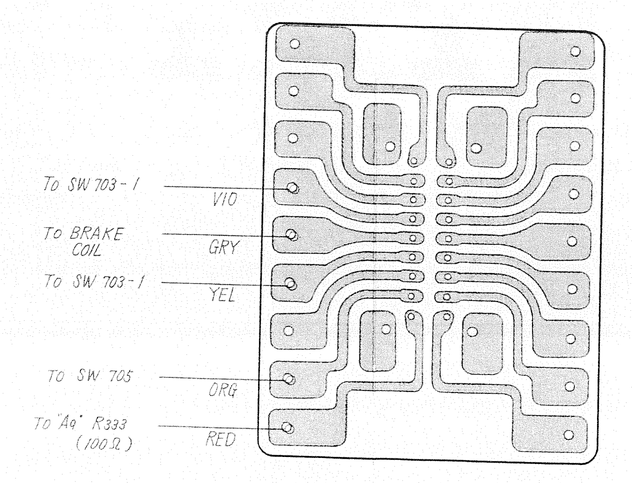
MUTING SWITCH


TO "C9" SW 601-5
YEL
TO "C9" GROUND
BLK
TO "C9" R632
BRN
TO SW 705
ORG

(SW707 - 1 , 2)

10-15 N2 CIRCUIT BOARD

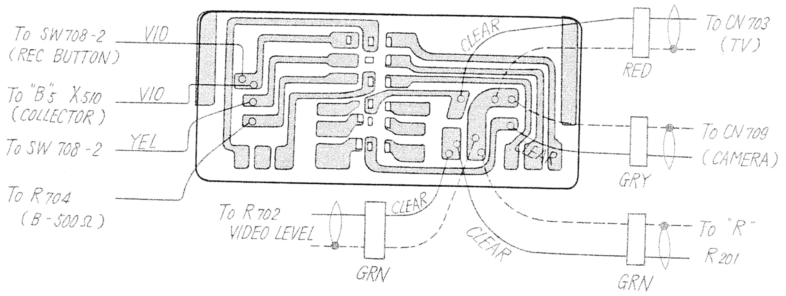
RECORDING BUTTON SWITCH


To SW 703-1
VIO
To BRAKE COIL
GRY
To SW 703-1
YEL
TO SW 705
ORG
TO "A9" R333 (100Ω)
RED

(REC . BUTTON)
SW 708 -1 , 2

10-16 U CIRCUIT BOARD

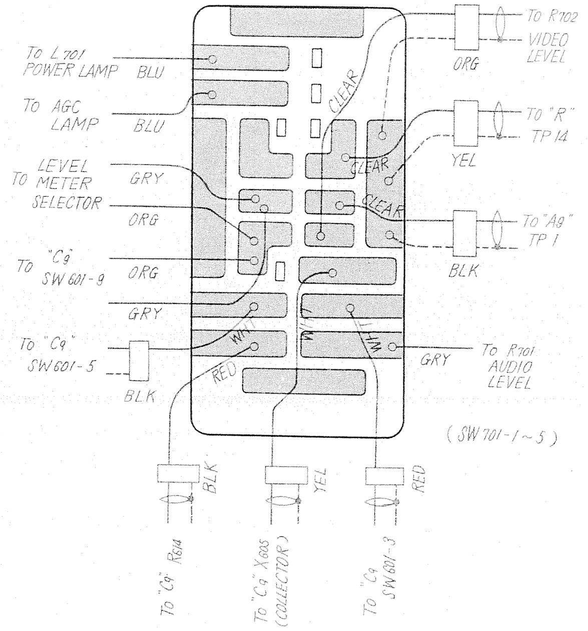
TV-CAMERA SWITCH


To SW 708-2 (REC BUTTON)
VIO
To "B5" X510 (COLLECTOR)
VIO
To SW 708-2
YEL
To R 704 (B-500Ω)
To R 702 VIDEO LEVEL
GRN
CLEAR
CLEAR
CLEAR
CLEAR
To CN 703 (TV)
RED
To CN 709 (CAMERA)
GRY
To "R" R 201
GRN

(TV ↔ CAMERA SELECTOR)
SW 7031 ~ 2

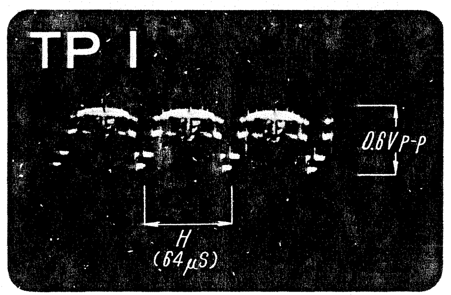
10-17 W CIRCUIT BOARD

AGC-MANUAL SWITCH

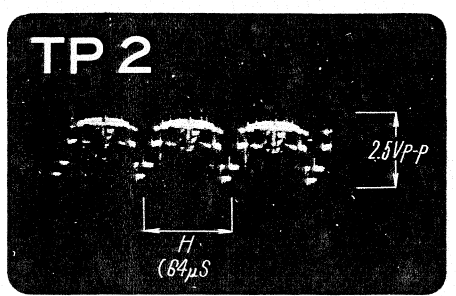

To L 701 POWER LAMP
BLU
To AGC LAMP
BLU
To LEVEL METER SELECTOR
GRY
ORG
To "C9" SW 601-9
ORG
GRY
To "C9" SW 601-5
BLK
RED
WHT
WHT
WHT
CLEAR
CLEAR
CLEAR
To R702 VIDEO LEVEL
ORG
To "R" TP 14
YEL
To "A9" TP 1
BLK
GRY
To R701 AUDIO LEVEL
BLK
YEL
RED
To "C9" R614
To "C9" X605 (COLLECTOR)
To "C9" SW 601-3

(SW 701-1 ~ 5)

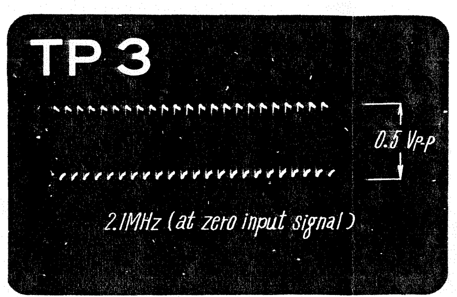
10-18 TEST POINT WAVEFORM



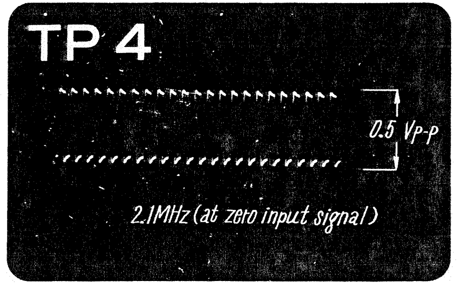
Modulator drive input



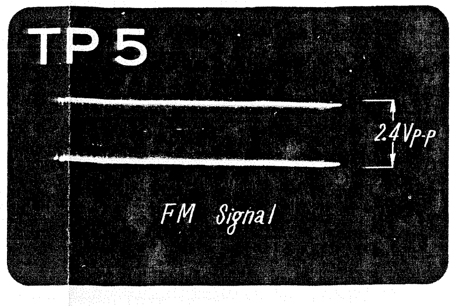
Freq Modulator input



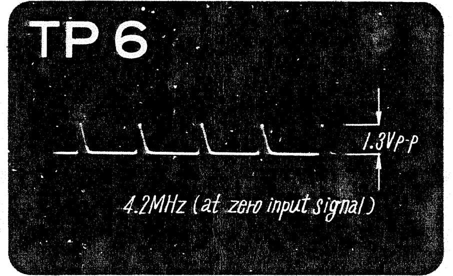
Limiter input (A11 Board)



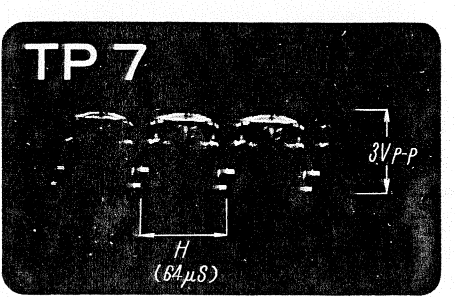
Limiter input (A 12 Board)



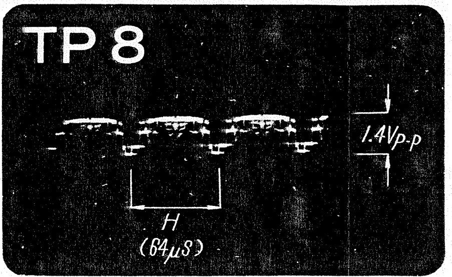
Limiter output



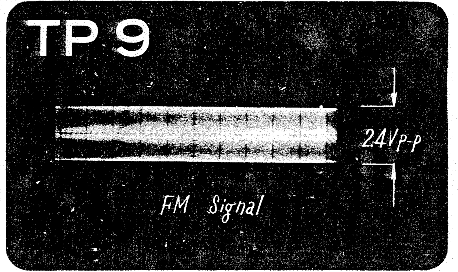
Demodulator output



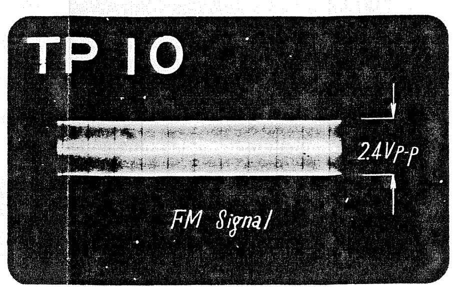
Video Amp 4 output



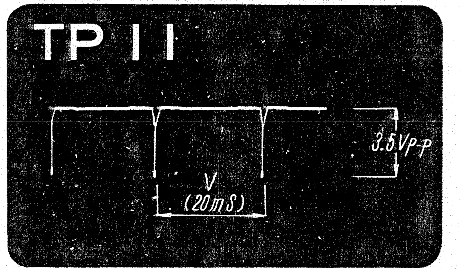
Video output



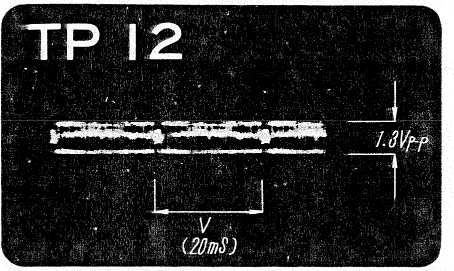
A Head signal



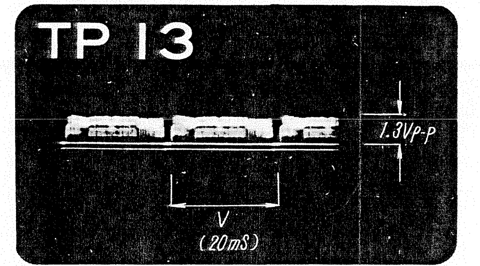
B Head signal



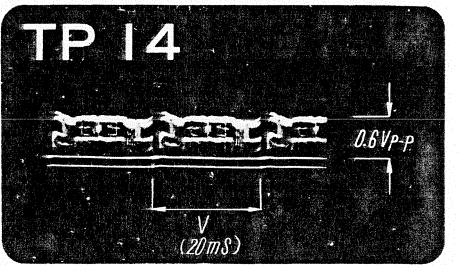
Sync Separator output



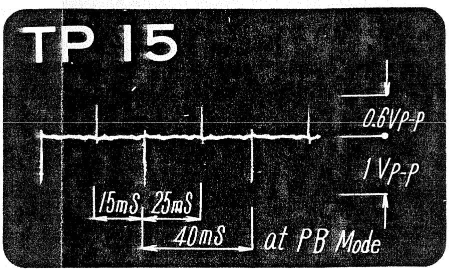
Noise Canceler output



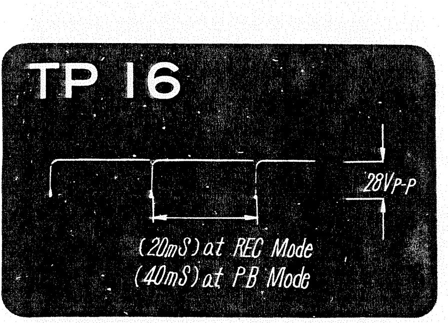
Video AGC Amp input



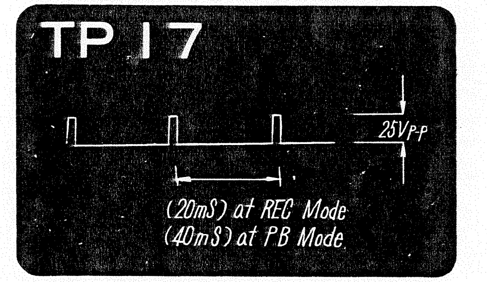
Video AGC Amp output



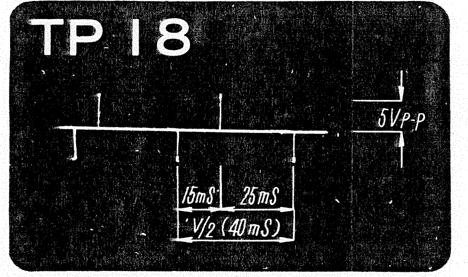
Servo Control Head Amp output



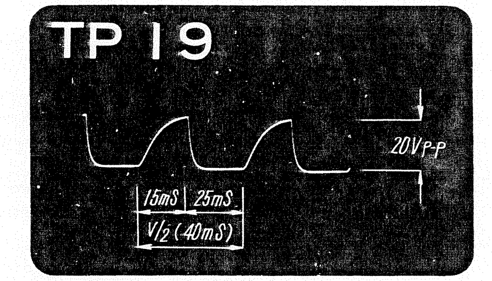
Sync Pulse Amp output



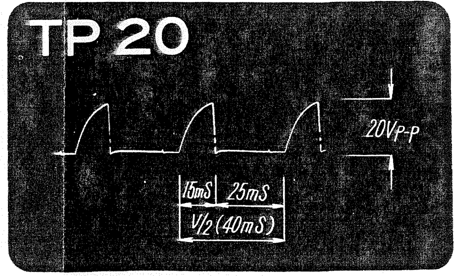
Delay Multi output



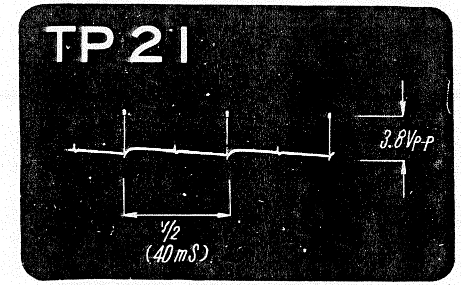
One Shot Multi output



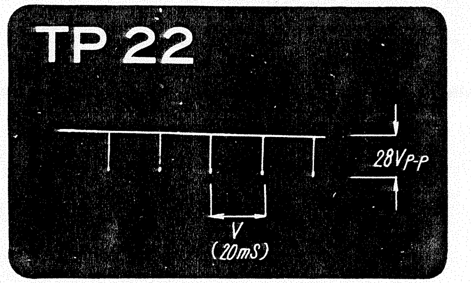
Pulse Amp input



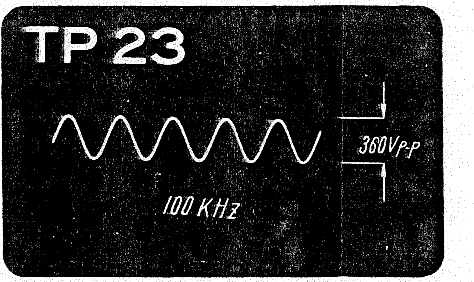
Pulse Amp output



Gate Pulse input



Field PG Amp output



Bias and Erase Oscillator output

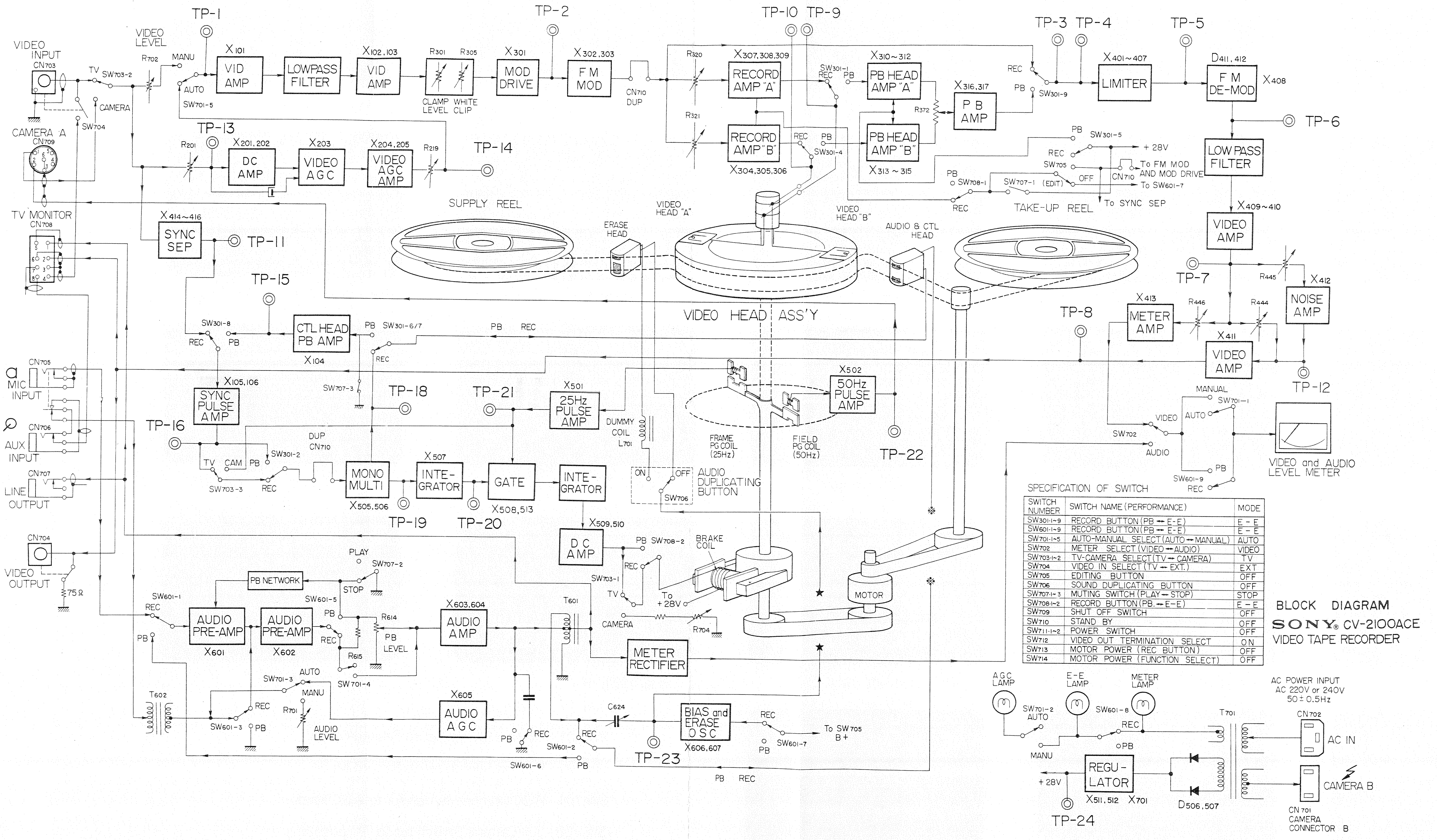
SW 301 - Record Switch set to Record-Mode.

SW 601 - Record Switch set to Record Mode.

SW 701 - AGC-Manual Switch set to AGC Mode.

SW 703 - TV-Camera Switch set to TV position.

* Waveform observations in the Servo System should be made with the scope's INPUT SELECTOR set to DC.

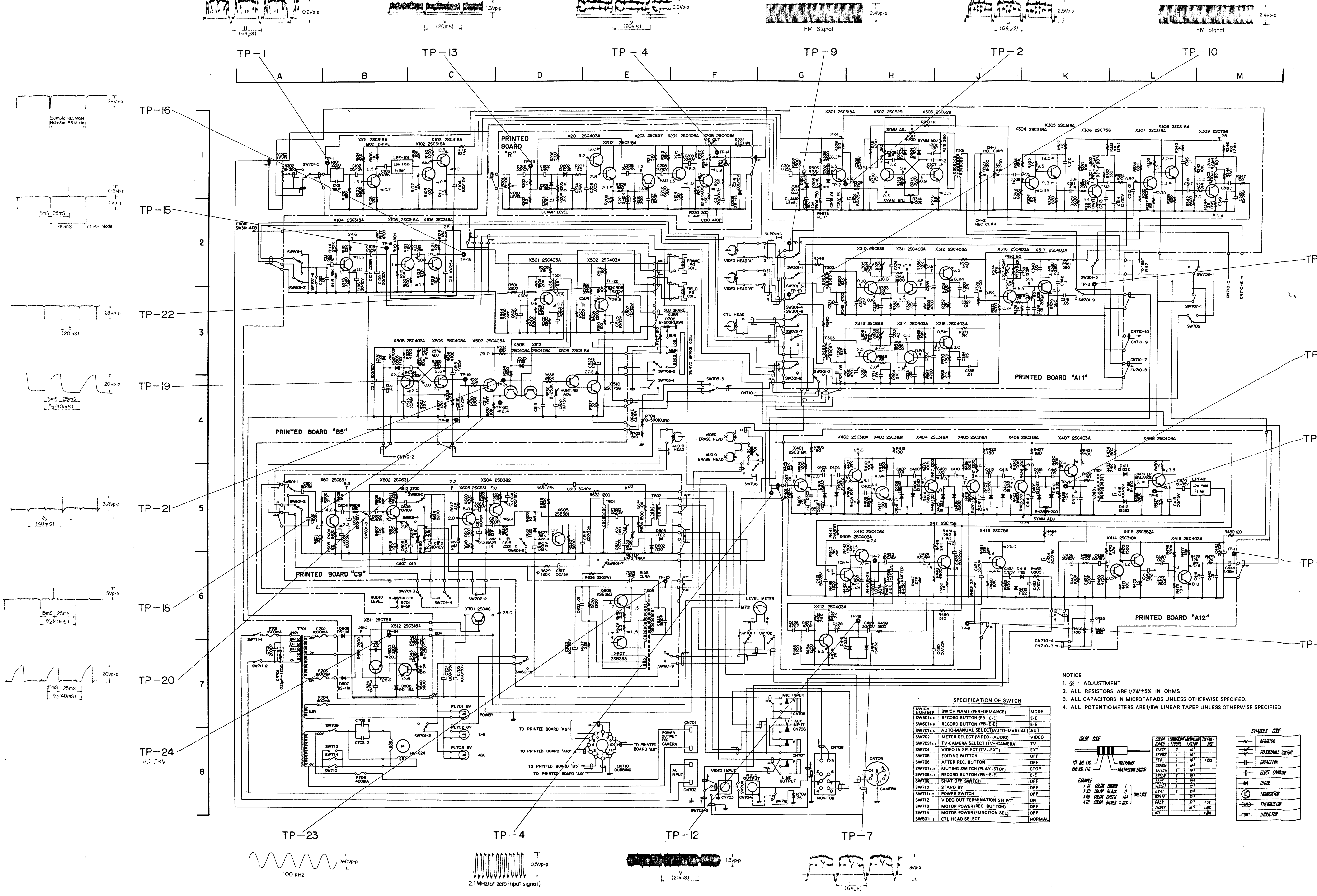

TP-1
TP-2
TP-10 TP-9
TP-3 TP-4
TP-5
VIDEO INPUT
CN703
TV
SW703-2
CAMERA
VIDEO LEVEL
R702
MANU
AUTO
SW701-5
X101
VID AMP
LOWPASS FILTER
X102,103
VID AMP
R301
R305
CLAMP LEVEL
WHITE CLIP
X301
MOD DRIVE
X302,303
F M MOD
CN710
DUP
R320
R321
X307,308,309
RECORD AMP "A"
RECORD AMP "B"
X304,305,306
SW301-1
REC
PB
SW301-4
X310~312
PB HEAD AMP "A"
PB HEAD AMP "B"
X313~315
R372
X316,317
P B AMP
REC
PB
SW301-9
X401~407
LIMITER
D411,412
F M DE-MOD
X408
TP-6
SW301-5
+28V
SW705
OFF
To FM MOD AND MOD DRIVE
To SW601-7
SW708-1
SW707-1 (EDIT)
CN710
To SYNC SEP
LOW PASS FILTER
X409~410
VIDEO AMP
CAMERA A
CN709
SW704
TP-13
R201
X201,202
DC AMP
X203
VIDEO AGC
X204,205
VIDEO AGC AMP
R219
TP-14
TV MONITOR
CN708
X414~416
SYNC SEP
TP-11
SUPPLY REEL
ERASE HEAD
VIDEO HEAD "A"
VIDEO HEAD "B"
AUDIO & CTL HEAD
TAKE-UP REEL
TP-7
R445
X412
NOISE AMP
TP-15
VIDEO HEAD ASS'Y
TP-8
X413
METER AMP
R446
R444
X411
VIDEO AMP
TP-12
SW301-8
REC
PB
CTL HEAD PB AMP
X104
PB
SW301-6/7
REC
CN705
MIC INPUT
X105,106
SYNC PULSE AMP
SW707-3
TP-18
TP-21
X501
25Hz PULSE AMP
X502
50Hz PULSE AMP
TP-22
DUMMY COIL
L701
FRAME PG COIL (25Hz)
FIELD PG COIL (50Hz)
MANUAL
SW701-1
VIDEO
AUTO
SW702
AUDIO
PB
SW601-9
REC
VIDEO and AUDIO LEVEL METER
CN706
AUX INPUT
TP-16
DUP
CN710
SW301-2
TV
CAM
PB
SW703-3
REC
MONO MULTI
X505,506
X507
INTE-GRATOR
GATE
X508,513
INTE-GRATOR
TP-19
TP-20
ON
OFF
SW706
AUDIO DUPLICATING BUTTON
CN707
LINE OUTPUT
CN704
VIDEO OUTPUT
75Ω
X509,510
D C AMP
PB
SW708-2
REC
BRAKE COIL
SW703-1
TV
To +28V
CAMERA
R704
MOTOR
PLAY
SW707-2
STOP
PB NETWORK
SW601-1
REC
PB
AUDIO PRE-AMP
X601
AUDIO PRE-AMP
X602
SW601-5
PB
REC
R614
PB LEVEL
R615
X603,604
AUDIO AMP
T601
METER RECTIFIER
SW701-3
AUTO
MANU
SW701-4
T602
REC
SW601-3
PB
R701
AUDIO LEVEL
X605
AUDIO AGC
PB
REC
SW601-2
REC
SW601-6
PB
C624
TP-23
BIAS and ERASE OSC
X606,607
REC
PB
SW601-7
To SW705 B+
PB
REC
AGC LAMP
SW701-2
AUTO
MANU
E-E LAMP
SW601-8
REC
PB
METER LAMP
T701
CN702
AC IN
AC POWER INPUT AC 220V or 240V 50±0.5Hz
+28V
REGU-LATOR
X511,512
X701
TP-24
D506,507
CAMERA B
CN701 CAMERA CONNECTOR B

SPECIFICATION OF SWITCH

SWITCH NUMBER	SWITCH NAME (PERFORMANCE)	MODE
SW301-1~9	RECORD BUTTON (PB ↔ E-E)	E-E
SW601-1~9	RECORD BUTTON (PB ↔ E-E)	E-E
SW701-1~5	AUTO-MANUAL SELECT (AUTO ↔ MANUAL)	AUTO
SW702	METER SELECT (VIDEO ↔ AUDIO)	VIDEO
SW703-1~2	TV-CAMERA SELECT (TV ↔ CAMERA)	TV
SW704	VIDEO IN SELECT (TV ↔ EXT.)	EXT
SW705	EDITING BUTTON	OFF
SW706	SOUND DUPLICATING BUTTON	OFF
SW707-1~3	MUTING SWITCH (PLAY ↔ STOP)	STOP
SW708-1~2	RECORD BUTTON (PB. ↔ E-E)	E-E
SW709	SHUT OFF SWITCH	OFF
SW710	STAND BY	OFF
SW711-1~2	POWER SWITCH	OFF
SW712	VIDEO OUT TERMINATION SELECT	ON
SW713	MOTOR POWER (REC BUTTON)	OFF
SW714	MOTOR POWER (FUNCTION SELECT)	OFF

BLOCK DIAGRAM
SONY® CV-2100ACE
VIDEO TAPE RECORDER

10-20 SCHEMATIC DIAGRAM


TP-1
TP-13
TP-14
TP-9
TP-2
TP-10
A
B
C
D
E
F
G
H
J
K
L
M
1
2
3
4
5
6
7
8
TP-16
TP-15
TP-22
TP-19
TP-21
TP-18
TP-20
TP-24
TP-3
TP-5
TP-6
TP-8
TP-23
TP-4
TP-12
TP-7
0.6Vp-p
H (64μS)
1.3Vp-p
V (20mS)
2.4Vp-p
FM Signal
2.5Vp-p
28Vp-p
120mS(at REC Mode)
140mS(at PB Mode)
1Vp-p
5mS 25mS
40mS at PB Mode
V (20mS)
20Vp-p
15mS 25mS
V/2 (40mS)
3.8Vp-p
5Vp-p
360Vp-p
100 kHz
0.5Vp-p
2.1MHz(at zero input signal)
3Vp-p
PRINTED BOARD "R"
PRINTED BOARD "B5"
PRINTED BOARD "C9"
PRINTED BOARD "A11"
PRINTED BOARD "A12"
VIDEO HEAD "A"
VIDEO HEAD "B"
CTL HEAD
VIDEO ERASE HEAD
AUDIO ERASE HEAD
AUDIO HEAD
FRAME PG COIL
FIELD PG COIL
SERVO BRAKE COIL
LEVEL METER
POWER
E-E
AGC
TO PRINTED BOARD "A9"
TO PRINTED BOARD "A10"
TO PRINTED BOARD "B5"
TO PRINTED BOARD "A9"
CN710 DUBBING
POWER OUTPUT FOR CAMERA
AC INPUT
VIDEO INPUT
VIDEO OUTPUT
LINE OUTPUT
MIC INPUT
AUX INPUT
MONITOR
CAMERA
COLOR CODE
1ST SIG. FIG.
2ND SIG. FIG.
TOLERANCE
MULTIPLYING FACTOR
EXAMPLE
1 ST COLOR BROWN 1
2 ND COLOR BLACK 0
3 RD COLOR GREEN 10⁵
4 TH COLOR SILVER ±10%
1MΩ±10%
SYMBOLS CODE
RESISTOR
ADJUSTABLE RESISTOR
CAPACITOR
ELECT. CAPACITOR
DIODE
TRANSISTOR
THERMISTOR
INDUCTOR

NOTICE

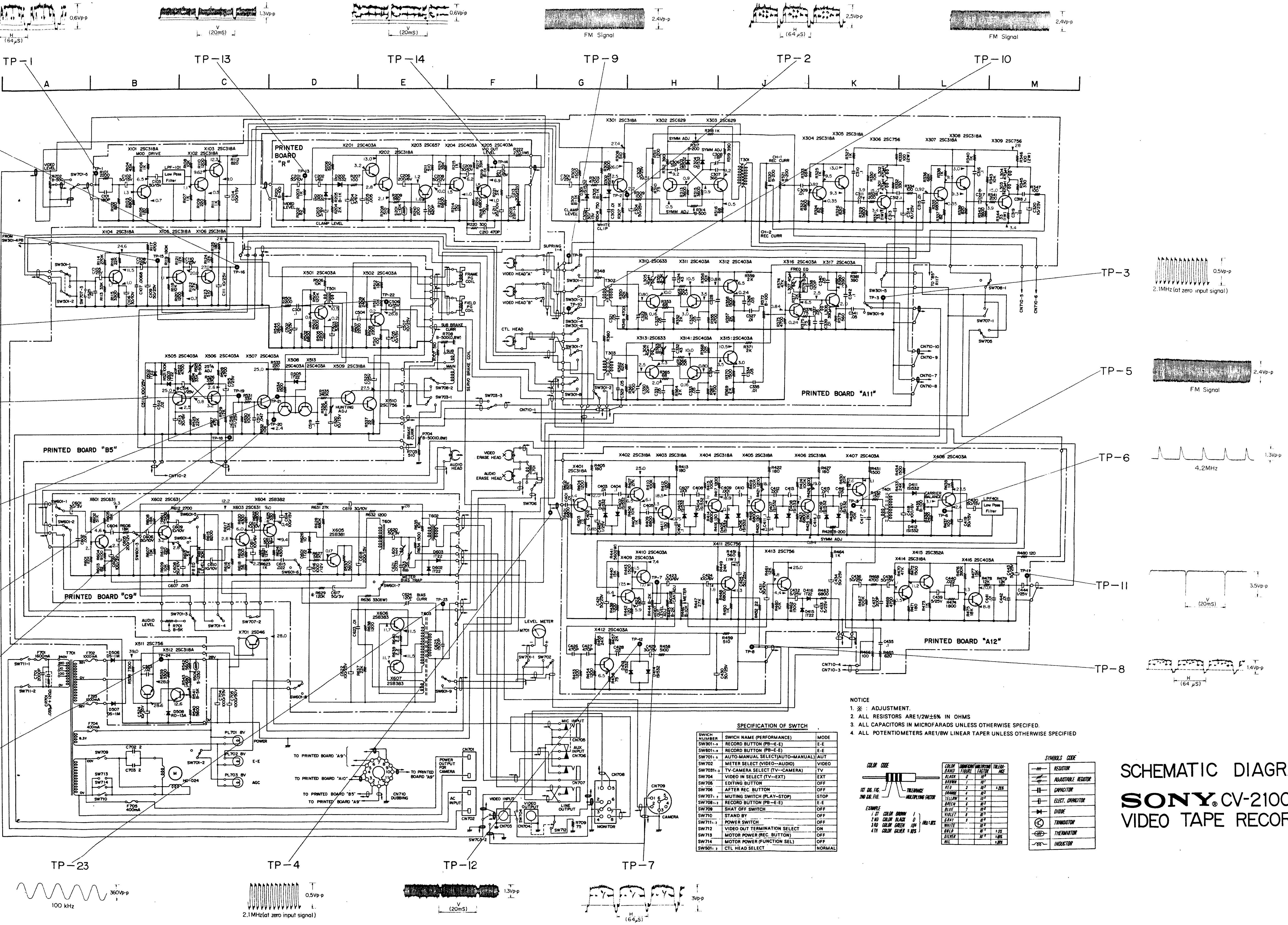
1. ※ : ADJUSTMENT.
2. ALL RESISTORS ARE 1/2W±5% IN OHMS
3. ALL CAPACITORS IN MICROFARADS UNLESS OTHERWISE SPECIFED.
4. ALL POTENTIOMETERS ARE 1/8W LINEAR TAPER UNLESS OTHERWISE SPECIFIED

SPECIFICATION OF SWTCH

SWICH NUMBER	SWICH NAME (PERFORMANCE)	MODE
SW301₁₋₉	RECORD BUTTON (PB--E-E)	E-E
SW601₁₋₉	RECORD BUTTON (PB–E-E)	E-E
SW701₁₋₅	AUTO-MANUAL SELECT(AUTO--MANUAL)	AUT
SW702	METER SELECT (VIDEO--AUDIO)	VIDEO
SW7031₁₋₃	TV-CAMERA SELECT (TV--CAMERA)	TV
SW704	VIDEO IN SELECT (TV--EXT)	EXT
SW705	EDITING BUTTON	OFF
SW706	AFTER REC. BUTTON	OFF
SW707₁₋₃	MUTING SWITCH (PLAY--STOP)	STOP
SW708₁₋₂	RECORD BUTTON (PB--E-E)	E-E
SW709	SHAT OFF SWITCH	OFF
SW710	STAND BY	OFF
SW711₁₋₂	POWER SWITCH	OFF
SW712	VIDEO OUT TERMINATION SELECT	ON
SW713	MOTOR POWER (REC. BUTTON)	OFF
SW714	MOTOR POWER (FUNCTION SEL)	OFF
SW501₁ ₂	CTL HEAD SELECT	NORMAL

COLOR BAND	SIGNIFICANT FIGURE	MULTIPLYING FACTOR	TOLERANCE
BLACK	0	10^0	
BROWN	1	10^1	
RED	3	10^2	±25%
ORANGE	4	10^3	
YELLOW	4	10^4	
GREEN	6	10^5	
BLUE	7	10^6	
VIOLET	8	10^7	
GRAY	9	10^8	
WHITE		10^9	
GOLD		10^{-1}	±5%
SILVER		10^{-2}	±10%
NIL			±20%

SC
S
VII


0.6Vp-p
H (64μS)
1.3Vp-p
V (20mS)
0.6Vp-p
V (20mS)
2.4Vp-p
FM Signal
2.5Vp-p
H (64μS)
2.4Vp-p
FM Signal
TP-1
TP-13
TP-14
TP-9
TP-2
TP-10
A
B
C
D
E
F
G
H
J
K
L
M
PRINTED BOARD "R"
PRINTED BOARD "B5"
PRINTED BOARD "C9"
PRINTED BOARD "A11"
PRINTED BOARD "A12"
TP-3
0.5Vp-p
2.1MHz (at zero input signal)
TP-5
2.4Vp-p
FM Signal
TP-6
1.3Vp-p
4.2MHz
TP-11
3.5Vp-p
V (20mS)
TP-8
1.4Vp-p
H (64μS)
TP-23
360Vp-p
100 kHz
TP-4
0.5Vp-p
2.1MHz (at zero input signal)
TP-12
1.3Vp-p
V (20mS)
TP-7
3Vp-p
H (64μS)
VIDEO HEAD "A"
VIDEO HEAD "B"
CTL HEAD
AUDIO HEAD
VIDEO ERASE HEAD
AUDIO ERASE HEAD
LEVEL METER
CAMERA
MONITOR
TO PRINTED BOARD "A9"
TO PRINTED BOARD "A10"
TO PRINTED BOARD "B5"
TO PRINTED BOARD "A9"
TO PRINTED BOARD "A9"
CN710 DUBBING

NOTICE
1. ※ : ADJUSTMENT.
2. ALL RESISTORS ARE 1/2W±5% IN OHMS
3. ALL CAPACITORS IN MICROFARADS UNLESS OTHERWISE SPECIFED.
4. ALL POTENTIOMETERS ARE 1/8W LINEAR TAPER UNLESS OTHERWISE SPECIFIED

SPECIFICATION OF SWTCH

SWICH NUMBER	SWICH NAME (PERFORMANCE)	MODE
SW301₁₋₉	RECORD BUTTON (PB—E-E)	E-E
SW601₁₋₉	RECORD BUTTON (PB—E-E)	E-E
SW701₁₋₅	AUTO-MANUAL SELECT (AUTO—MANUAL)	AUT
SW702	METER SELECT (VIDEO—AUDIO)	VIDEO
SW7031₁₋₃	TV-CAMERA SELECT (TV—CAMERA)	TV
SW704	VIDEO IN SELECT (TV—EXT)	EXT
SW705	EDITING BUTTON	OFF
SW706	AFTER REC. BUTTON	OFF
SW707₁ ₂	MUTING SWITCH (PLAY—STOP)	STOP
SW708₁₋₂	RECORD BUTTON (PB—E-E)	E-E
SW709	SHAT OFF SWITCH	OFF
SW710	STAND BY	OFF
SW711₁₋₂	POWER SWITCH	OFF
SW712	VIDEO OUT TERMINATION SELECT	ON
SW713	MOTOR POWER (REC. BUTTON)	OFF
SW714	MOTOR POWER (FUNCTION SEL)	OFF
SW501₁ ₂	CTL HEAD SELECT	NORMAL

COLOR CODE

1ST SIG. FIG.
2ND SIG. FIG.
TOLERANCE
MULTIPLYING FACTOR

EXAMPLE
1 ST COLOR BROWN 1
2 ND COLOR BLACK 0
3 RD COLOR GREEN 10⁵
4 TH COLOR SILVER ±10%
1MΩ±10%

COLOR BAND	SIGNIFICANT FIGURE	MULTIPLYING FACTOR	TOLERANCE
BLACK	0	10^0	
BROWN	1	10^1	
RED	3	10^2	±25%
ORANGE	4	10^3	
YELLOW	4	10^4	
GREEN	6	10^5	
BLUE	7	10^6	
VIOLET	8	10^7	
GRAY	9	10^8	
WHITE		10^9	
GOLD		10^{-1}	±5%
SILVER		10^{-2}	±10%
NIL			±20%

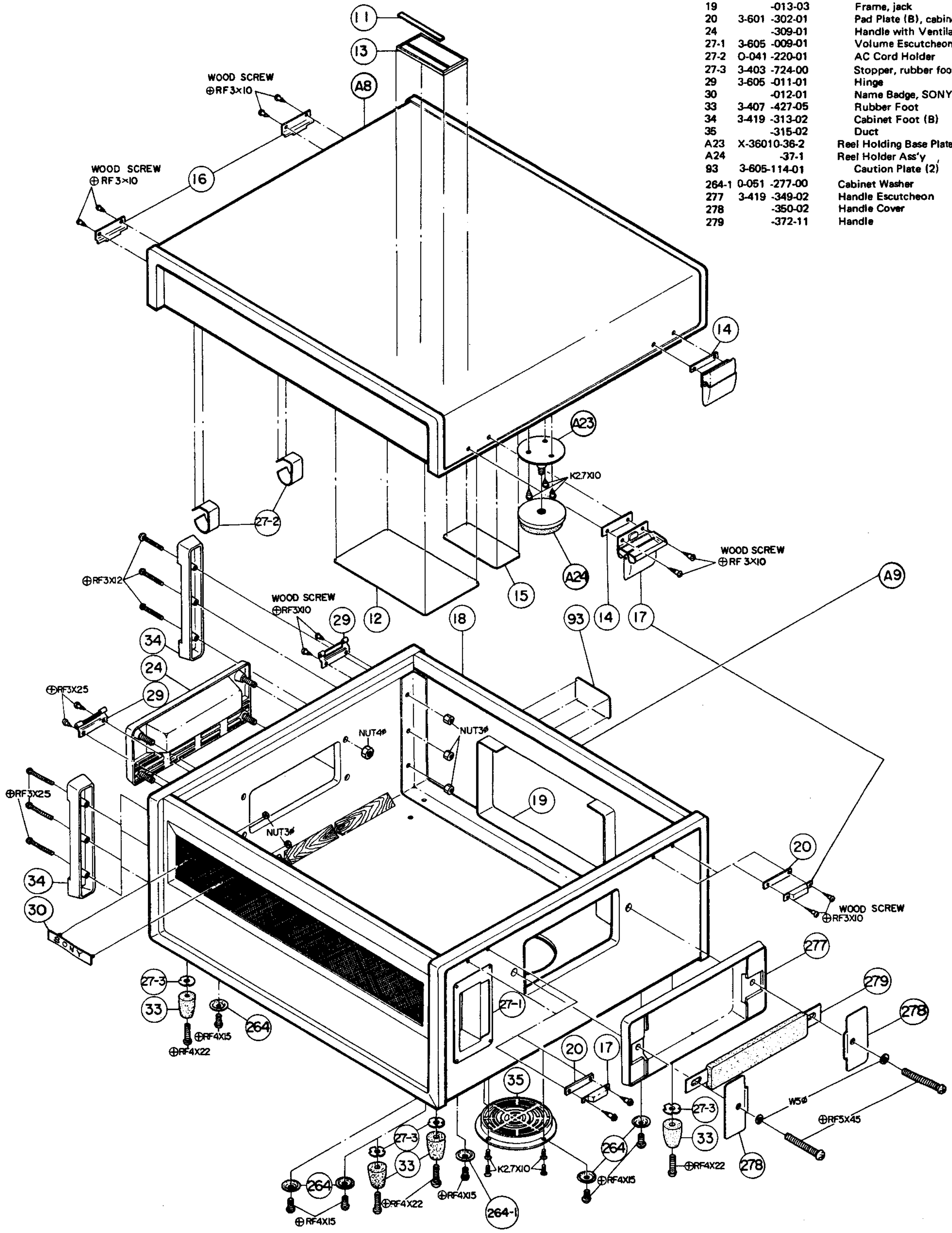
SYMBOLS CODE

—WW—	RESISTOR
—WW—	ADJUSTABLE RESISTOR
—‖—	CAPACITOR
—[]—	ELECT. CAPACITOR
—▶—	DIODE
Ⓚ	TRANSISTOR
—(WW)—	THERMISTOR
—ᴗᴗᴗ—	INDUCTOR

SCHEMATIC DIAGRAM
SONY® CV-2100ACE
VIDEO TAPE RECORDER

10-21 EXPLODED VIEW, CABINET ASSEMBLY

Ref NO	Part NO	Description
A8	X-36077-07-1	Cabinet Cover Ass'y, including
11	3-607 -714-01	Model Name Badge (C), CV-2100ACE
12	-011-02	Reference, tape threading
13	3-601 -314-01	Name Badge (A)
14	-316-02	Pad Plate (A)
15	-329-01	Caution Plate
16	3-605-015-01	Hinge (B)
17	3-103 -554-00	Catch
A9	X-36070-09-3	Cabinet Body Ass'y, including
18	3-607 -012-03	Cabinet Body
19	-013-03	Frame, jack
20	3-601 -302-01	Pad Plate (B), cabinet body clasp
24	-309-01	Handle with Ventilation
27-1	3-605 -009-01	Volume Escutcheon
27-2	0-041 -220-01	AC Cord Holder
27-3	3-403 -724-00	Stopper, rubber foot
29	3-605 -011-01	Hinge
30	-012-01	Name Badge, SONY
33	3-407 -427-05	Rubber Foot
34	3-419 -313-02	Cabinet Foot (B)
35	-315-02	Duct
A23	X-36010-36-2	Reel Holding Base Plate Ass'y
A24	-37-1	Reel Holder Ass'y
93	3-605-114-01	Caution Plate (2)
264-1	0-051 -277-00	Cabinet Washer
277	3-419 -349-02	Handle Escutcheon
278	-350-02	Handle Cover
279	-372-11	Handle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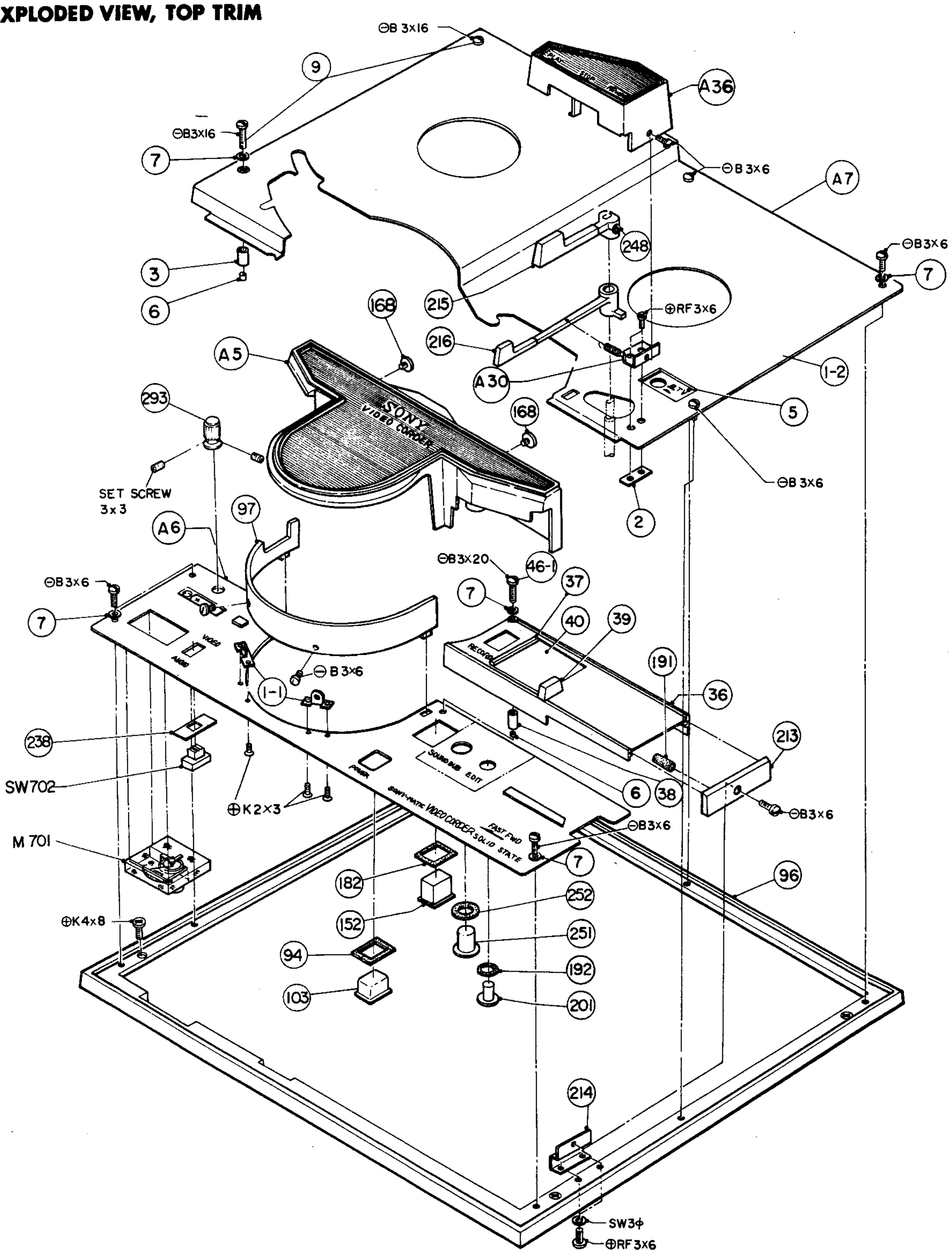
13
A8
WOOD SCREW
⊕RF3×10
WOOD SCREW
⊕RF3×10
16
14
A23
K2.7X10
27-2
A24
15
WOOD SCREW
⊕RF 3X10
⊕RF3X12
WOOD SCREW
⊕RF3X10
29
12
18
93
14
17
A9
34
24
⊕RF3X25
29
NUT4ϕ
NUT3ϕ
⊕RF3X25
19
NUT3ϕ
20
34
30
SONY
WOOD SCREW
⊕RF3X10
277
27-3
279
33
27-1
278
⊕RF4X15
264
⊕RF4X22
20
17
35
W5ϕ
27-3
⊕RF5X45
33
264
27-3
33
K2.7X10
⊕RF4X22
278
264
⊕RF4X15
⊕RF4X22
⊕RF4X15
264-1
⊕RF4X15

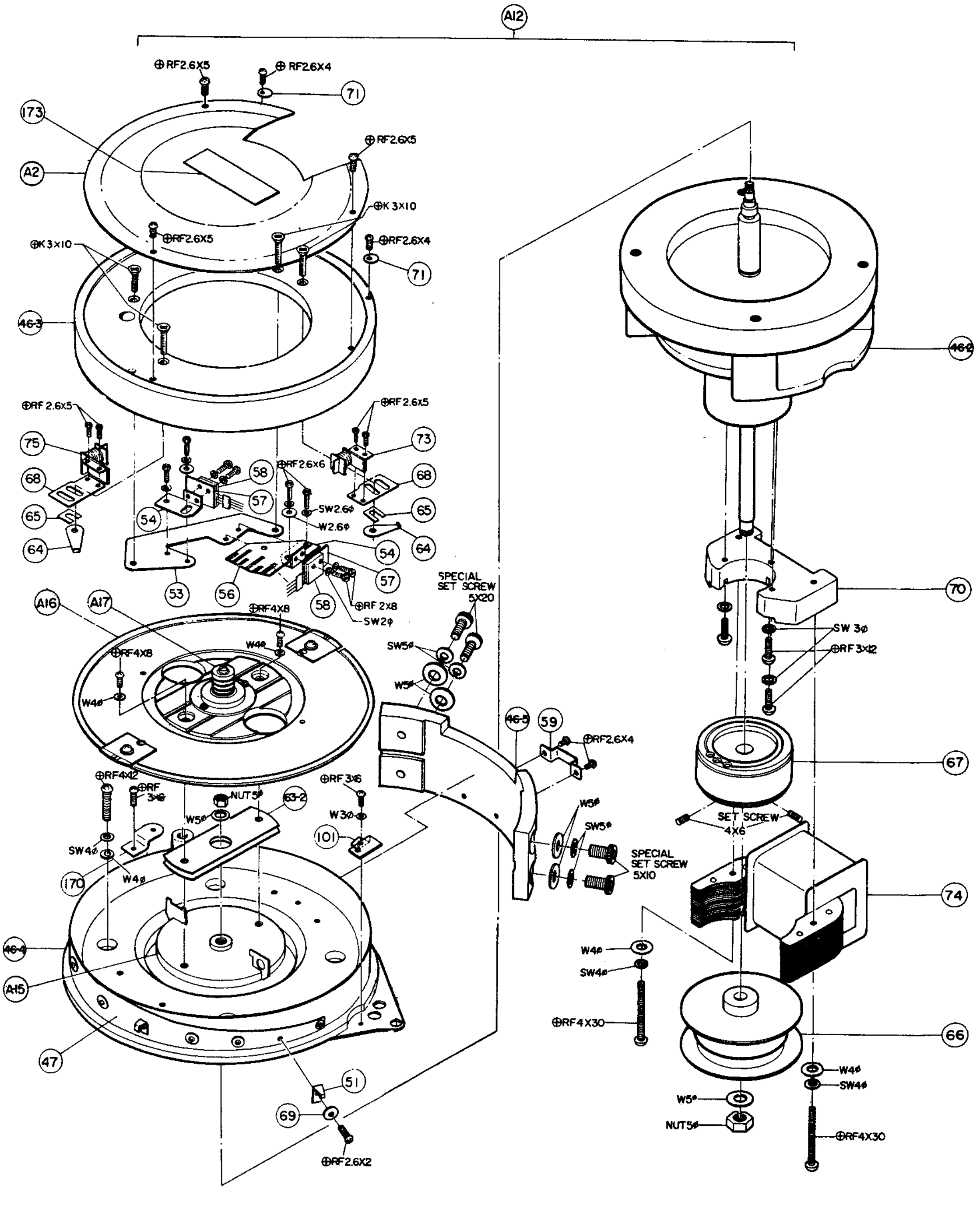
10-22 EXPLODED VIEW, TOP TRIM


⊖B 3x16
9
A36
⊖B3x16
7
⊖B 3x6
A7
⊖B3x6
7
3
248
6
215
⊕RF 3x6
168
216
A5
SONY
VIDEO CORDER
A30
1-2
293
168
5
SET SCREW
3x3
⊖B 3x6
2
97
A6
⊖B3x20
46-1
37
⊖B3x6
7
40
39
7
191
VIDEO
AUDIO
RECORD
⊖B 3x6
36
1-1
213
238
SOUND DUB
EDIT
SW702
POWER
6
38
⊖B3x6
⊕K2x3
SONY-MATIC VIDEO CORDER SOLID STATE
FAST FWD
⊖B3x6
M 701
7
96
182
252
152
⊕K4x8
251
94
192
103
201
214
SW3φ
⊕RF3x6

Ref NO	Part NO	Description
A5	X-36070-05-2	Head Cover, Ass'y
A6	X-36077-06-1	Control Panel Ass'y
1-1	3-607-007-01	Guard Holder
A7	X-36070-07-2	Reel Panel Ass'y, including
1-2	3-607 -008-02	Reel Panel
2	3-601 -269-01	Fastener, reel panel
3	-270-01	Spacer, reel panel
5	3-605 -004-01	Name Plate, switch
6	3-103 -526-01	Stopper, reel panel spacer
7	-947-00	Panel Washer
9	7-621 -772-03	Screw (-) B 3 x 16, black
37	3-604 -212-03	Knob, after recording cover
38	-213-01	Spacer, sash
39	-214-02	Holder (A)
40	3-604 -224-06	Cover, after recording
46-1	7-621 -772-07	Screw (-) B 3 x 20, black
A30	X-36010-84-1	Fast Forward Spring Ass'y, including
A36	-19-3	Function Selector Cover Ass'y
94	3-607 -041-02	Felt (3), AC power switch button
96	3-607 -043-01	Sash
97	-044-01	Guard
103	-050-02	Power Switch Button
152	3-601 -101-03	REC Button
168	-263-01	Set Screw, head cover
182	-278-02	Felt (A), push button
191	3-604 -141-03	Fast Forward Lever Cushion
192	-144-01	Felt (2), editing button
201	-160-01	Editing Button
213	-181-03	Finger Holder (B)
214	-182-04	Receptacle Metal, sash
215	-188-02	Function Selector Lever
216	-189-02	Fast Forward Lever
238	3-605 -059-01	Ornamental Board, switch
248	-081-01	Special Set Screw 6φ, function selector knob
251	-102-01	Sound Dub Button
252	-103-01	Felt (4), push button
293	2-054-138-11	Skew Control Knob
SW701	1-513 -347-11	Slide Switch, SW701
M701	1-524 -032-21	Level Meter M701

10-23 EXPLODED VIEW, ROTARY HEAD DRUM ASSEMBLLY

DETAIL "A"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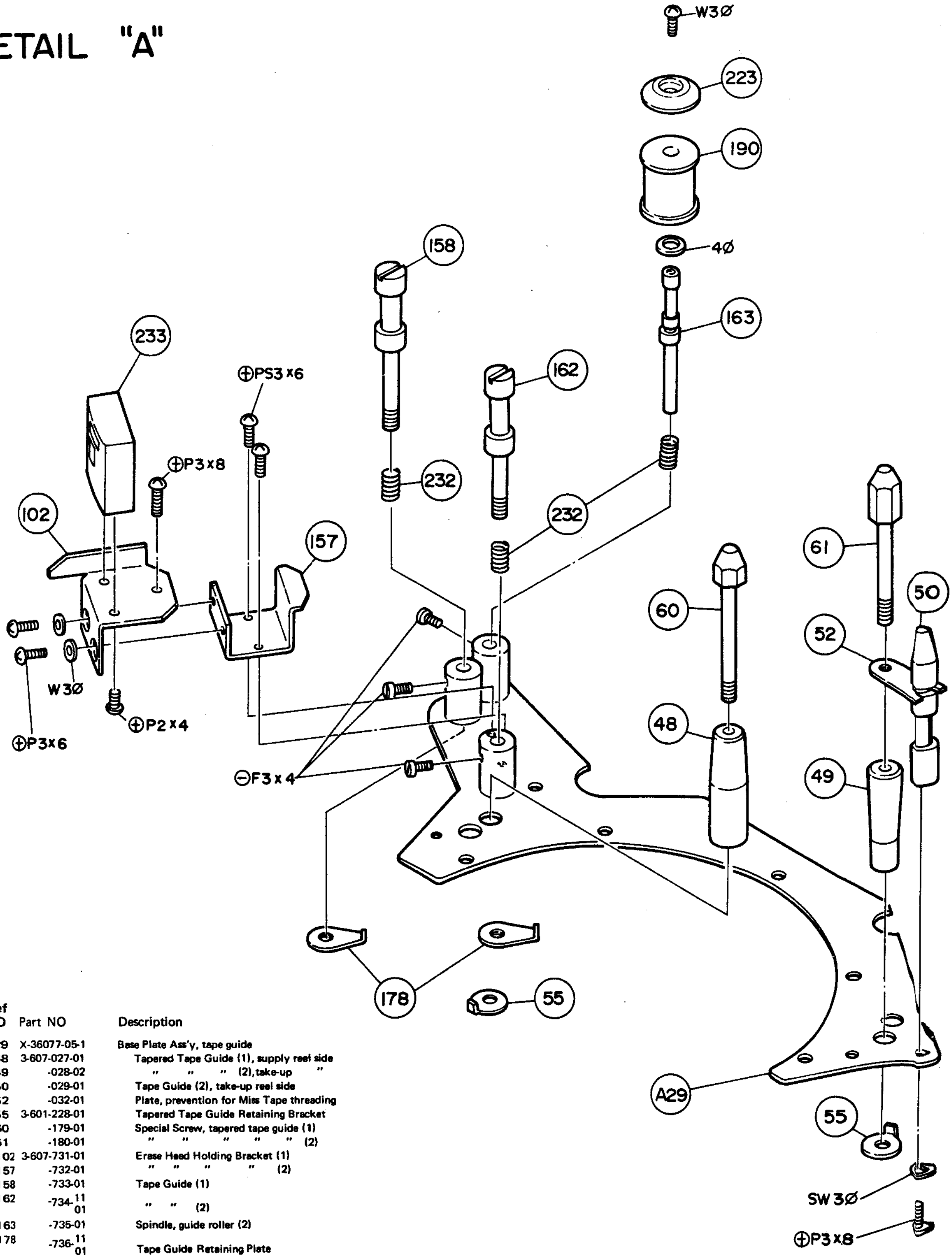
⊕RF2.6X5
⊕RF2.6X4
71
173
A2
⊕RF2.6X5
⊕K3X10
⊕K3x10
⊕RF2.6X5
⊕RF2.6X4
71
46-3
46-2
⊕RF 2.6X5
⊕RF 2.6X5
75
73
68
58
⊕RF2.6X6
68
57
SW2.6φ
65
54
W2.6φ
65
64
54
64
57
53
56
58
⊕RF 2X8
SW2φ
SPECIAL SET SCREW 5X20
70
A16
A17
⊕RF4X8
W4φ
⊕RF4X8
SW5φ
SW 3φ
⊕RF 3X12
W5φ
W4φ
46-5
59
⊕RF2.6X4
67
⊕RF4X12
⊕RF 3X6
NUT5φ
63-2
⊕RF3X6
W3φ
W5φ
W5φ
SW5φ
SET SCREW 4X6
101
SW4φ
SPECIAL SET SCREW 5X10
170
W4φ
74
46-4
W4φ
SW4φ
A15
⊕RF4X30
66
47
51
W4φ
SW4φ
W5φ
69
NUT5φ
⊕RF4X30
⊕RF2.6X2

Ref NO	Part NO	Description
A2	X-36070 -02-1	Drum Cover Ass'y
A12		Rotary Head Drum Ass'y, DA-0408
A16	Y-27112-02-2	Video Head Ass'y, E01-07
46-2	3-607 -021-01	Drum Mounting
46-3	-022-04	Upper Drum
46-4	-023-04	Lower Drum
46-5	-024-04	Drum Holder
47	-026-01	Band, guide
53	-033-01	Brush Holding Bracket
54	-034-01	Brush Adjusting Bracket
56	3-607 -035-01	Printed Circuit Board, brush mounting
57	-037-01	Brush Mounting
58	-070-01	Brush
59	3-607 -078-01	Holder, lead wire for brush
A17	X-27112-01-1	Slip Ring Ass'y
63	3-601 -236-01 04	Spacer, frange
64	-239-01	PG Coil Adjustment Spacer
65	-243-01	PG Coil Adjustment Washer
66	-903-07	Rotary Head Pulley
67	-911-01	Rotor, brake coil
68	3-604 -064-02	Holding Bracket, 50 PG Coil
69	-069-02	Retaining, guide band
70	-070-04	Stator Holding, brake coil
71	-276-01	Drum Block
73	1-419 -012-15	Coil 2, 50 PG
74	1-452 -025-11	Brake Coil
101	3-607 -048-02	Control Panel Supporting Bracket
170	3-601 -266-01	Panel Supporting Bracket
173	-342-01	Caution Seal, rotary head

10-24 EXPLODED VIEW, TAPE GUIDE PLATE

DETAIL "A"

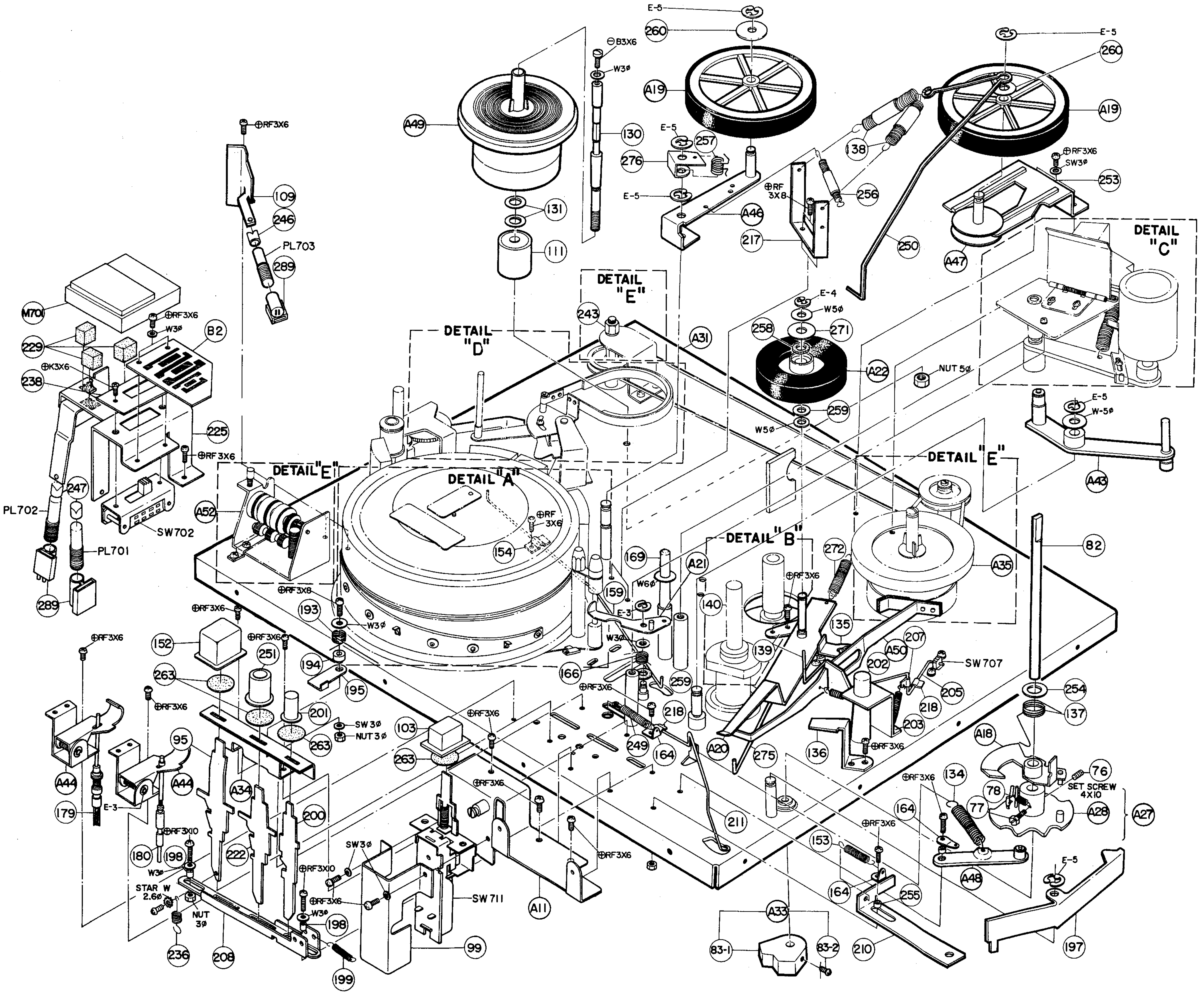

W30
223
190
40
158
163
233
⊕PS3×6
162
⊕P3×8
232
232
102
157
61
50
60
52
W30
⊕P2×4
⊕P3×6
48
⊖F3×4
49
178
55
A29
55
SW30
⊕P3×8

Ref NO	Part NO	Description
A29	X-36077-05-1	Base Plate Ass'y, tape guide
48	3-607-027-01	Tapered Tape Guide (1), supply reel side
49	-028-02	" " " (2), take-up "
50	-029-01	Tape Guide (2), take-up reel side
52	-032-01	Plate, prevention for Miss Tape threading
55	3-601-228-01	Tapered Tape Guide Retaining Bracket
60	-179-01	Special Screw, tapered tape guide (1)
61	-180-01	" " " " " (2)
102	3-607-731-01	Erase Head Holding Bracket (1)
157	-732-01	" " " " (2)
158	-733-01	Tape Guide (1)
162	-734-11 01	" " (2)
163	-735-01	Spindle, guide roller (2)
178	-736-11 01	Tape Guide Retaining Plate
190	-737-01	Guide Roller
223	3-604-180-02	Retainer, guide roller
232	-738-01	Tape Guide Spring
233	8-828-321-00	Erase Head

10-25 EXPLODED VIEW, TAPE TRANSPORT

Parts List for Tape Transport

Ref NO	Part NO	Description
A11	X-36070 -13-2	Power Switch Holding Bracket Ass'y
A18	X-36010- -13-3	Fast Forward Cam (S) Ass'y
A19	-17-3	Rewind Idler (S) Ass'y
A20	-20-2	Idler Plate Ass'y
A21	X-36077 -09-1	Tension Brake Control Lever Ass'y
A22	X-36010 -24-1	Idler (S) Ass'y
A27	-67-2	Function Selector Cam Ass'y, including
A28	-12-1	Function Selector Cam (S) Ass'y
76	3-601 -357-01	Special Setting Screw 4 x 10
77	0-006 -050-00	Set Screw
78	0-027 -207-00	Spring, pushing rod
82	3-601 -271-01	Fast Forward Spring
A31	X-36077 -10-1	Base Plate Ass'y
A33	X-36040 -05-1	Cam Shaft Ass'y
83-1	3-604 -006-01	Cam, micro switch
83-2	7-621 -261-65	Screw, (+) RF 3 x 10
A34	X-36040 -09-3	Holding Plate, record button ass'y
A35	-14-2	Take-up Reel Table Ass'y
A43	X-36050 -02-1	Pinch Lever (B) Ass'y
A44	X-36077 -01-1	REC Setting Lever Ass'y
A46	X-00270 -09-2	Idler Arm (C) Ass'y
A47	-10-4	Idler Shaft C) Ass'y
A48	-12-0	Stepper Arm Ass'y
A49	X-36050 -22-1	Supply Reel Table Ass'y
A50	-23-3	Brake Lever Ass'y
A52	X-20165 -52-2S	Tape Timer (Type VII) Ass'y
95	3-607 -042-01	Plate, REC button
99	-046-01	AC Switch Cover
103	-050-02	Power Switch Button
109	-758-01	Lamp Holding Bracket, AGC lamp
111	-059-01	Supply Reel Table Mounter
130	3-601 -036-02	Supply Reel Spindle
131	-037-01	Thrust Bearer (S)
134	-052-02	Stepper Spring
135	-057-01	Idler Stopper
136	-058-03	Fast Forward Cam Stopper
137	-059-02	Fast Forward Reset Spring (S)
138	-060-02	Rewind Idler Reset Spring
139	-062-01	Idler Guide (S)
152	-101-03	REC Button
153	-107-01	Spring, REC lock bar
154	-119-01	Push Rod Retainer
157	3-607 -731-01	Erase Head Holding Bracket (2)
159	-739-01	Tension Brake Off Rod
164	3-601 -127-01	Spring Holder
166	-170-01	Actuator Spring
169	-265-01	Supporting Stud A (1), head cover
179	-374-12	Slide SW Release (C9)
180	-374-22	" " " (A11)
193	3-604 -150-01	Selector Spring
194	-151-01	Selector Spacer
195	-152-01	Selector
197	-154-03	Change Lever, REC button
198	-155-01	Spacer, lock sliding board
199	-156-03	Spring, lock sliding board
200	-159-01	Plate, editing button
201	-160-01	Editing Button
202	-161-02	Camera Switch Button
203	-162-01	Mounting Bracket, camera switch
205	-167-01	Pushing Rod, muting switch
207	-169-01	Spring Holder (2)
208	-170-02	Pull Plate, inter lock
210	-173-02	Push Plate, inter lock
211	-176-01	Mounting Bracket, micro switch
217	-245-01	Spring Supporting Bracket
218	-246-01	Holder, pushing rod (2)
222	-147-04	Plate, after recording button
225	3-605 -037-02	Meter Holding Bracket
229	-048-01	Cushion, meter
236	-057-02	Spring, slide switch, REC
238	-059-01	Ornamental Board, switch
241	3-605 -063-01	Pulley, tape counter
243	-065-02	Pulley Holding Bracket
246	-078-01	P.V.C. Tube, lamp (large, AGC lamp
247	-079-01	" " " (small)
249	-084-01	Spring, REC reset rod
250	-088-01	Pushing Rod
251	-102-01	Sound Dub Button
253	0-027 -019-01	Idler Guide Holding Bracket
254	-035-01	Spacer 5ø, thin
255	-134-00	Stepper Shaft
256	-194-00	Helical Spring (E), fast forward idler
257	-200-00	Brake Block Spring
258	-216-00	Oil Ring 5ø, F.F. Idler Felt
260	-221-00	Paper Washer 6ø
263	0-051 -221-00	Knob Pad, REC; sound dub power switch EDIT button
271	3-409 -102-01	P.V.C. Washer (B)
272	3-410 -038-00	Spring, idler press
275	3-419 -033-02	Idler Pushing Rod
276	-093-01	Brake Block (S)
289	1-517 -003-00	Pilot Lamp Holder
B2	1-538 -624-11	Printed Circuit Board, B2 leve indicator lead wire junction



E-5
260
⊖B3X6
W3ø
A19
A49
130
E-5
257
276
E-5
131
111
A46
⊕RF 3X8
217
138
256
250
⊕RF3X6
SW3ø
253
A47
DETAIL "C"
E-5
260
A19
⊕RF3X6
109
246
PL703
289
M701
229
⊕K3X6
238
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W3ø
B2
225
⊕RF3X6
PL702
247
PL701
SW702
289
A52
DETAIL "E"
DETAIL "D"
DETAIL "E"
243
A31
258
E-4
W5ø
271
A22
NUT 5ø
259
W5ø
E-5
W-5ø
A43
DETAIL "E"
DETAIL "A"
⊕RF 3X6
154
DETAIL "B"
272
A35
82
169
A21
W6ø
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159
E-3
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W3ø
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139
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A50
202
SW707
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W3ø
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195
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259
205
218
254
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251
263
201
SW3ø
NUT3ø
263
103
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249
164
⊕RF3X6
218
A20
275
136
203
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A18
76
SET SCREW 4X10
A28
A27
78
77
134
⊕RF3X6
164
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A44
95
A44
A34
179
E-3
200
211
153
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⊕RF3X10
180
198
W3ø
STAR W 2.6ø
NUT 3ø
222
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SW3ø
⊕RF3X6
W3ø
SW711
A11
⊕RF3X6
A48
E-5
164
255
198
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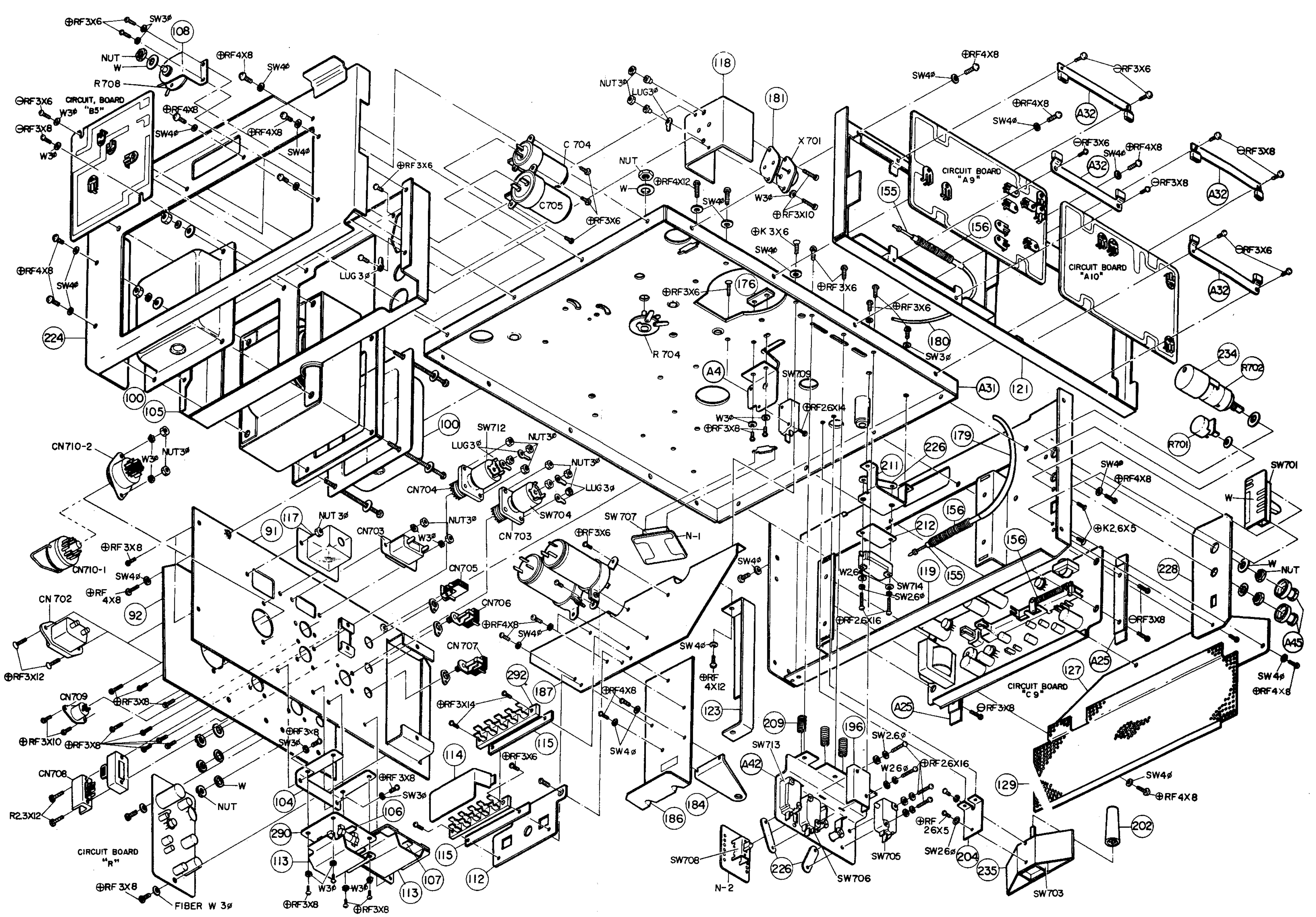
208
199
99
A33
83-1
83-2
210
197

10-26 EXPLODED VIEW, BOTTOM CHASSIS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R708
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SW4ø
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W3ø
⊕RF4X8
SW4ø
⊕RF4X8
SW4ø
⊕RF4X8
SW4ø
224
100
105
⊕RF3X6
LUG 3ø
C 704
C705
⊕RF3X6
NUT 3ø
LUG3ø
118
181
X 701
NUT
W
⊕RF4X12
SW4ø
W3ø
⊕RF3X10
⊕K 3X6
SW4ø
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R 704
A4
SW709
W3ø
⊕RF3X8
⊕RF2.6X14
180
SW3ø
A31
121
155
156
CIRCUIT BOARD "A9"
CIRCUIT BOARD "A10"
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SW4ø
⊖RF3X6
⊕RF4X8
SW4ø
A32
⊖RF3X6
SW4ø
⊕RF4X8
A32
⊖RF3X8
⊖RF3X8
A32
⊖RF3X6
A32
234
R702
R701
SW701
W
CN710-2
W3ø
NUT3ø
100
SW712
LUG3ø
NUT3ø
NUT3ø
LUG 3ø
CN704
SW704
CN 703
NUT3ø
117
NUT 3ø
91
CN703
W3ø
SW 707
N-1
⊕RF3X6
⊕RF 3X8
CN710-1
SW4ø
⊕RF 4X8
CN 702
92
CN705
CN706
⊕RF4X8
SW4ø
CN707
⊕RF3X12
CN709
⊕RF3X8
⊕RF3X10
⊕RF3X8
CN708
R2.3X12
W
NUT
CIRCUIT BOARD "R"
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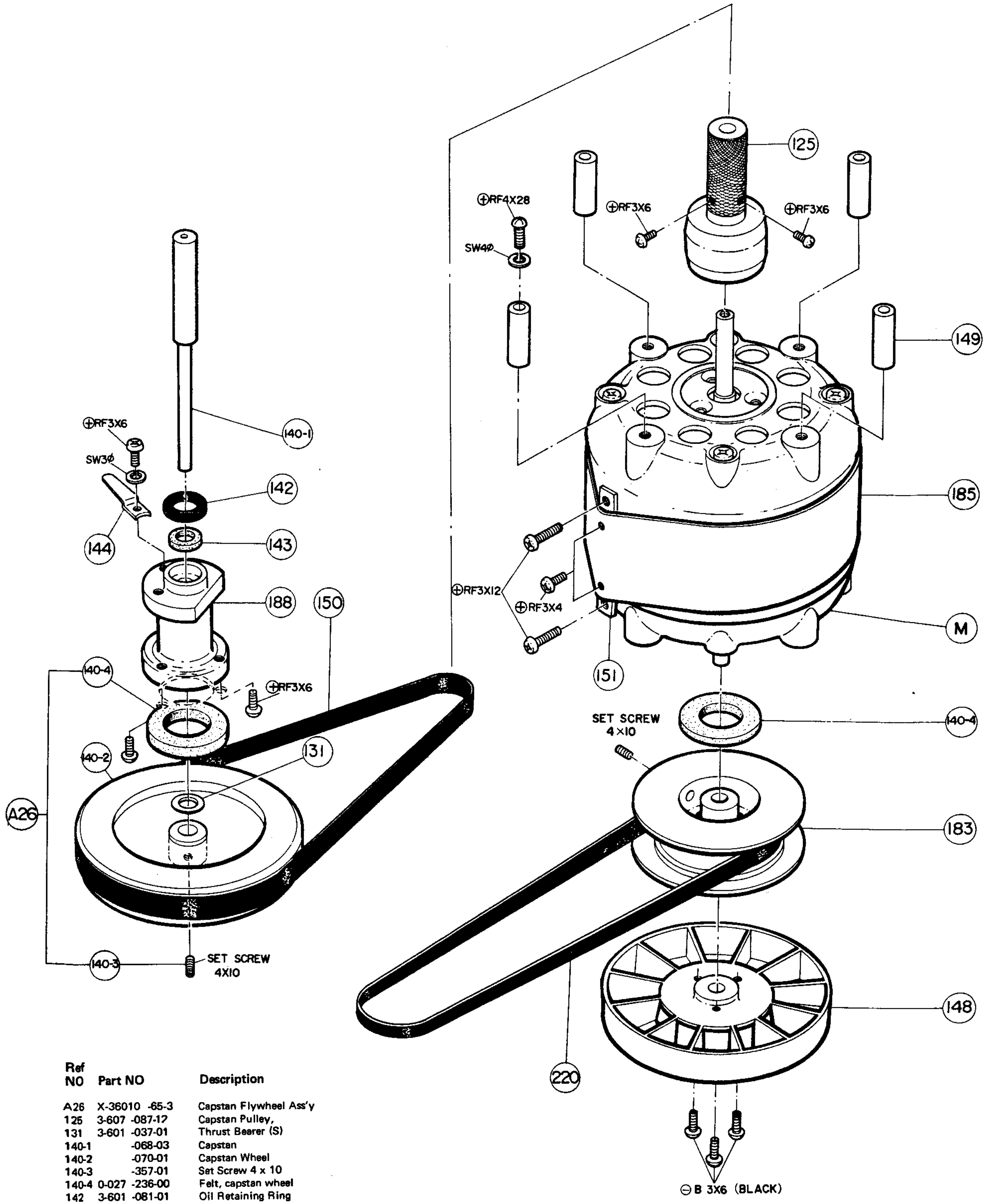
FIBER W 3ø
⊕RF3X8
SW3ø
⊕RF3X14
292
187
114
⊕RF3X6
115
⊕RF 3X8
SW3ø
104
106
290
113
W3ø
W3ø
⊕RF3X8
⊕RF3X8
113
107
115
112
⊕RF4X8
SW4ø
SW4ø
⊕RF 4X12
123
209
SW713
196
A42
184
186
SW708
N-2
226
SW706
SW705
SW2.6ø
W26ø
⊕RF2.6X16
⊕RF 26X5
SW26ø
204
235
SW703
202
211
226
179
212
156
119
155
W26
SW714
SW26ø
⊕RF2.6X16
156
SW4ø
⊕RF4X8
⊕K2.6X5
228
W
NUT
⊖RF3X8
A45
SW4ø
⊕RF4X8
CIRCUIT BOARD "C9"
127
A25
A25
⊖RF3X8
129
SW4ø
⊕RF4X8

Ref NO	Part NO	Description
A 4	X-36070 -04-3	Actuator Ass'y
A25	X-36010 -61-3	Holding Plate Ass'y, audio board
A31	X-36077 -10-1	Base Plate Ass'y
A32	X-36040 -04-4	Holding Plate (3) Ass'y, circuit board
A42	X-36050 -01-1	REC Button Stopper (2) Ass'y
A45	-08-3	Knob Ass'y, including
91	3-607 -038-05	Connector Panel
92	-039-04	Ornamental Connector Panel
100	-047-02	Power Transformer Cover
104	-051-01	Holding Bracket, fuse holder
105	-052-04	Chassis, power supply
106	-054-02	Fuse Indication Label (A), 1600MAT, 400MAT 400MAT
107	3-607 -055-02	" " " (B), 800 MA
108	-056-01	Holding Bracket, adjustable resistor
112	-060-02	Holding Plate, AC line lug board
113	-061-02	Cover, fuse holder
114	-062-02	Cover, AC line lug board
115	-063-01	Insulating Board, AC line lug board
117	-065-01	AC Receptacle Cover
118	-068-01	Heat Sink
119	-069-01	Side Chassis (right)
121	-081-03	Video Board
123	-085-02	Reinforcing Bracket (2), base plate
129	3-601 -028-04	Shield Cover (C)
155	3-601 -123-02	Bushing Release, plastic clear
156	-125-02	Spring, REC switch
176	-352-01	Actuator Adjusting Plate
179	-374-12	Slide SW Release (C9)
180	-374-22	" " " (A9)
181	-388-01	Insulating Sheet, transistor
184	-121-01	Reinforcing Plate, motor
186	-123-02	Supporting Plate, circuit board
187	-124-06	Reinforcing Plate
196	-153-02	Shield Cover, micro switch
202	-161-02	Camera Switch Button
204	-163-02	Guide, camera switch
209	-171-03	Coil Spring, push plate
211	3-604 -176-01	Mounting Brakcet, micro switch
212	-178-01	Spacer, micro switch
224	3-605 -032-01	Side Chassis (left)
226	-041-01	Adjustment Plate, micro switch
228	-047-02	Ornamental Plate, knob
234	-054-01	Switch Cover
235	-055-02	Reinforcing Metal, camera switch
290	1-533 -026-11	Fuse Holder, 3P
292	1-356 -176-11	Lug, 5P
R701	1-221 -873-11	Potentiometer 5K ohms, audio level control
R702 SW710	)1-221-598-11	Potentiometer with Switch, 500 ohms, video level control

10-27 EXPLODED VIEW, MOTOR DRIVE SYSTEM

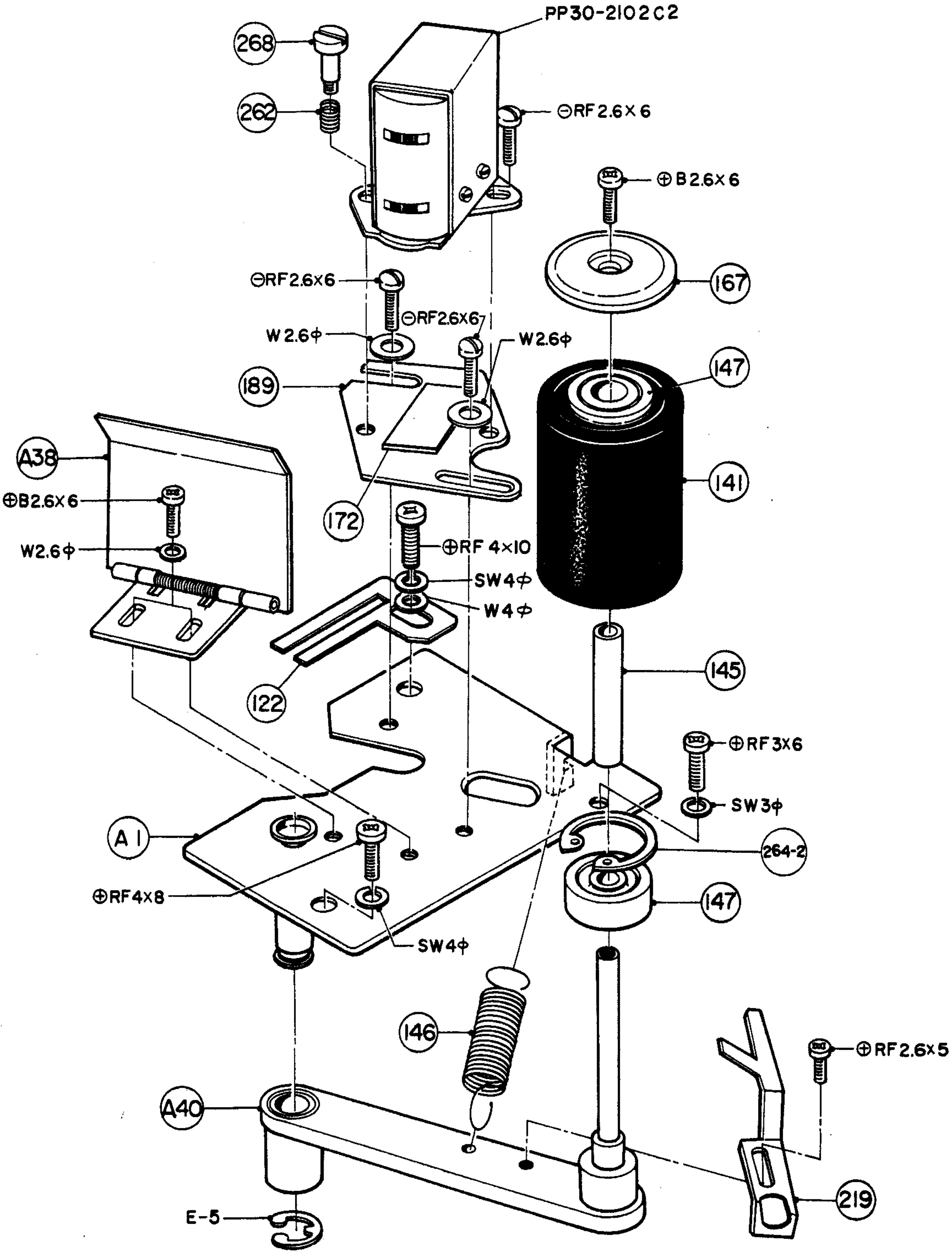
DETAIL "B"


125
⊕RF4X28
⊕RF3X6
⊕RF3X6
SW4Φ
149
⊕RF3X6
SW3Φ
140-1
142
144
143
188
150
185
⊕RF3X12
⊕RF3X4
M
151
140-4
⊕RF3X6
SET SCREW
4×10
140-4
140-2
131
A26
183
140-3
SET SCREW
4X10
148
220
⊖B 3X6 (BLACK)

Ref NO	Part NO	Description
A26	X-36010 -65-3	Capstan Flywheel Ass'y
125	3-607 -087-12	Capstan Pulley,
131	3-601 -037-01	Thrust Bearer (S)
140-1	-068-03	Capstan
140-2	-070-01	Capstan Wheel
140-3	-357-01	Set Screw 4 x 10
140-4	0-027 -236-00	Felt, capstan wheel
142	3-601 -081-01	Oil Retaining Ring
143	-082-01	Oil Ring
144	-083-02	Pull Rod Retainer
148	-090-01	Motor Fan (S)
149	-094-01	Motor Supporting Post
150	-095-02	Capstan Belt (50)
151	-098-01	Hum-proof Belt Mounting Bracket
183	-906-01	Motor Pulley (50)
185	3-604 -122-01	Hum-proof Belt, capstan motor
188	131-01	Capstan Shaft Bearer
220	-269-01	Belt, drum
M	8-831 -024-00	Motor HC-024

10-28 EXPLODED VIEW, AUDIO/CONTROL HEAD PLATFORM

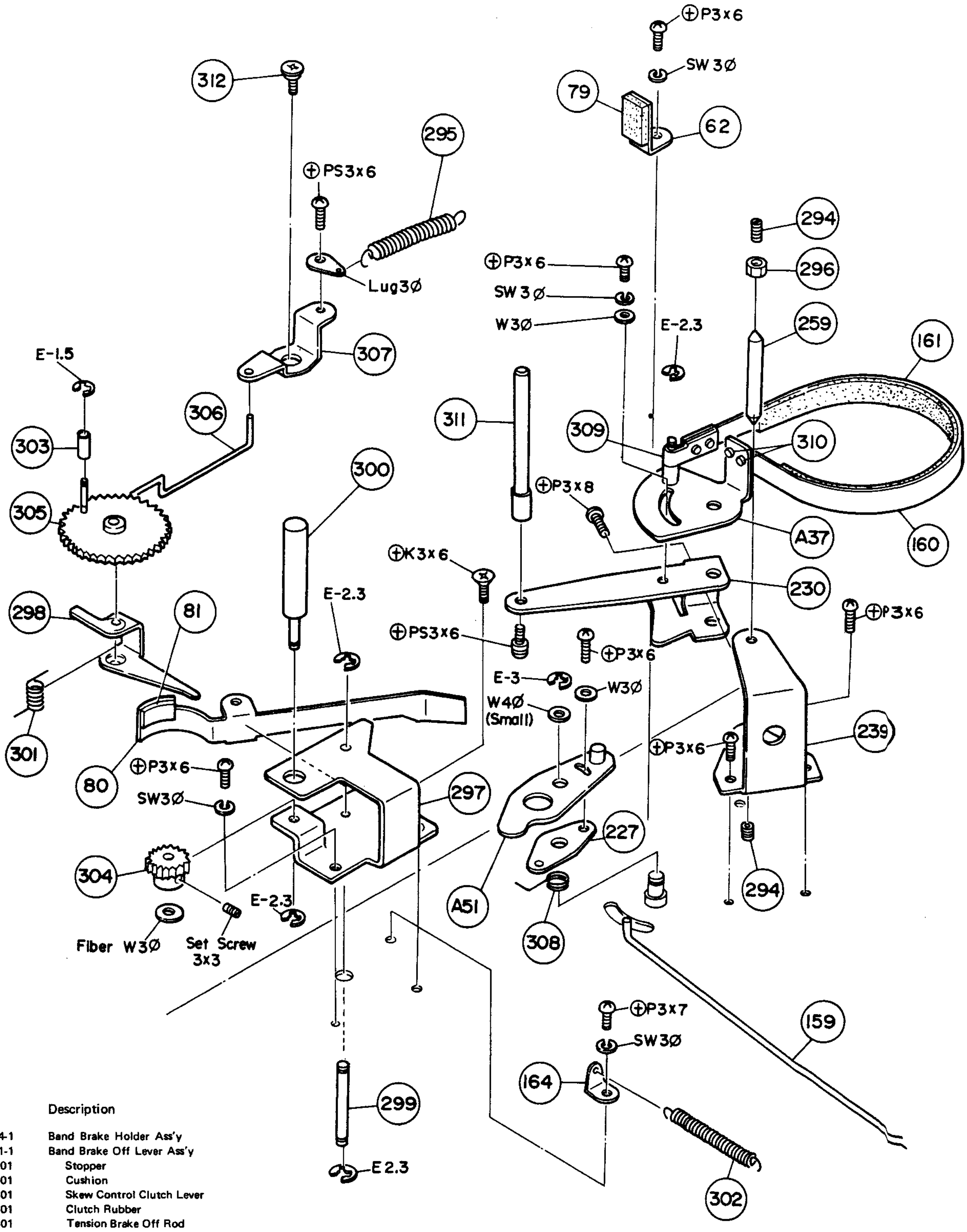
DETAIL "C"


PP30-2102C2
268
262
⊖RF2.6×6
⊕B2.6×6
167
⊖RF2.6×6
⊖RF2.6×6
W2.6ϕ
W2.6ϕ
147
189
A38
141
⊕B2.6×6
172
⊕RF 4×10
W2.6ϕ
SW4ϕ
W4ϕ
145
122
⊕RF3×6
SW3ϕ
A1
264-2
⊕RF4×8
147
SW4ϕ
146
⊕RF2.6×5
A40
219
E-5

Ref NO	Part NO	Description
A1	X-36070 -01-1	Capstan Base Plate Ass'y
A38	X-36040 -27-6	Head Shield Plate Ass'y
A40	-28-1	Pinch Lever (A) Ass'y
122	3-607 -082-01	Actuator Guide
141	3-601 -071-01	Pinch Roller
145	-086-01	Spacer, pinch roller spindle
146	-087-01	Spring Pinch Roller
147	-088-02	Ball Bearing, 634ZZ
167	-256-02	Retainer, pinch roller
172	-291-01	Spacer, audio head
189	3-604 -132-01	Head Mounting Deck
219	-251-04	Tape Holder
262	0-051 -040-00	Spring, CTL/audio head
264-2	7-624 -183-11	Stop Washer C-16
268	3-401 -068-01	CTL/Audio Head Adjustment Screw

10-29 EXPLODED VIEW, TENSION BRAKE SERVO

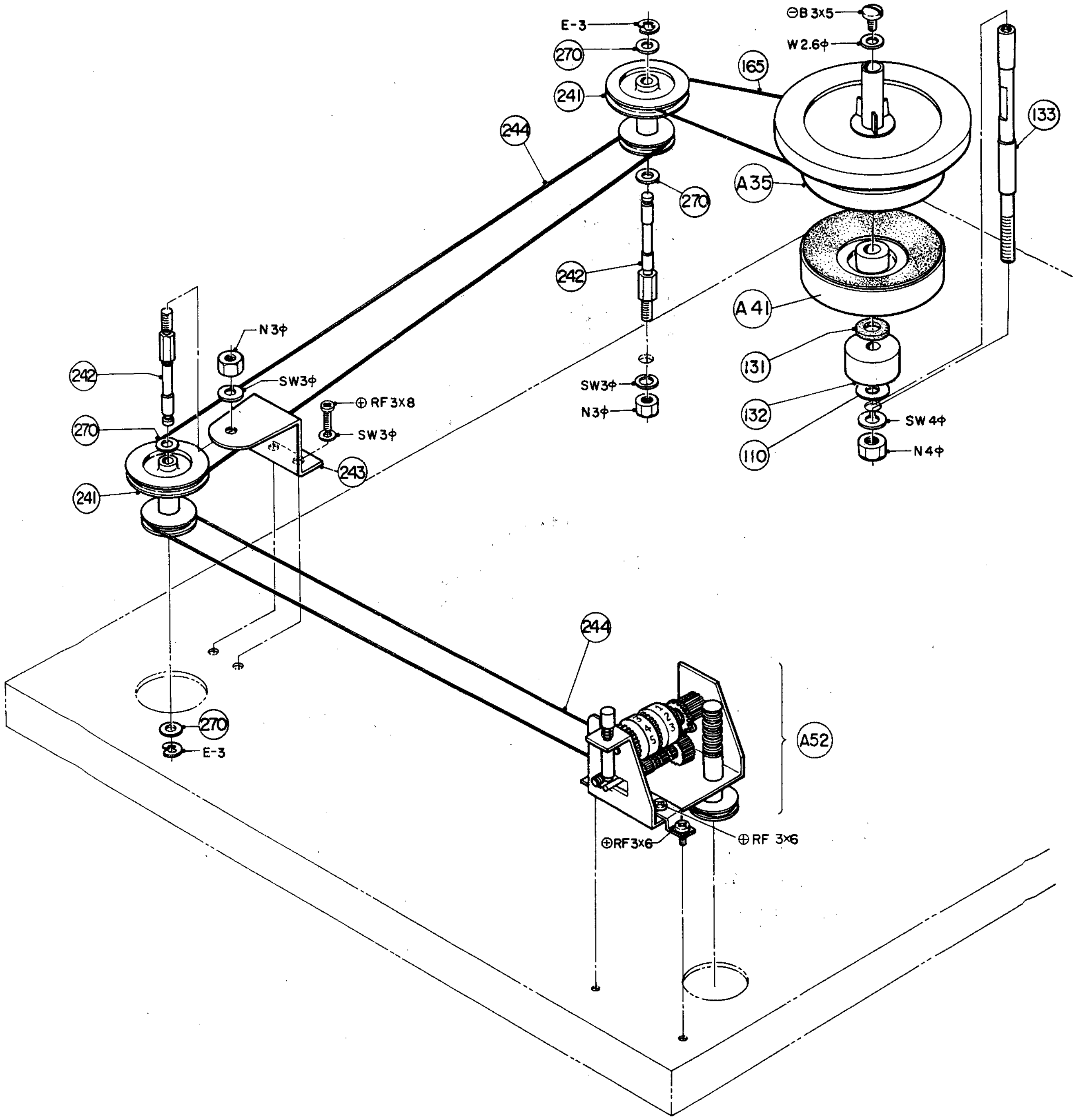
DETAIL "D"


⊕P3x6
SW 3Ø
79
62
312
295
⊕PS3x6
Lug3Ø
294
296
⊕P3x6
SW 3Ø
W3Ø
E-2.3
259
161
E-1.5
307
306
303
311
309
310
305
300
⊕P3x8
A37
160
⊕K3x6
230
E-2.3
298
81
⊕PS3x6
⊕P3x6
⊕P3x6
E-3
W3Ø
W4Ø
(Small)
301
80
⊕P3x6
SW3Ø
⊕P3x6
239
297
227
304
E-2.3
A51
294
308
Fiber W3Ø
Set Screw
3x3
⊕P3x7
SW3Ø
159
164
299
E2.3
302

Ref NO	Part NO	Description
A37	X-36077-04-1	Band Brake Holder Ass'y
A51	X-36077-11-1	Band Brake Off Lever Ass'y
62	3-607-702-01	Stopper
79	-703-01	Cushion
80	-704-01	Skew Control Clutch Lever
81	-705-01	Clutch Rubber
159	-739-01	Tension Brake Off Rod
160	-708-01	Brake Band
161	-709-01	Brake Felt
164	3-601-127-01	Spring Holder
227	3-607-740-01	Tension Brake Off Lever
230	-741-01	Tension Arm
239	-742-01	Pivot Bearing Holder
259	-743-01	Pivot Shaft (A)
294	-744-01	Pivot Bearing
295	-745-01	Spring, tension arm
296	-746-01	Nut M3
297	-747-01	Skew Control Box
298	-748-01	" " Stopper
299	-749-01	" " Shaft
300	-750-01	" " Knob Shaft
301	-751-01	Spring, skew control clutch
302	-752-01	" clutch plate
303	-753-01	Vynil Collor
304	-754-01	Skew Control Gear (1)
305	-755-01	" " " (2)
306	-756-01	" " Pushing Rod
307	-757-01	Tension Lever
308	-759-01	Spring, return
309	3-610-057-01	Retainer, brake band
310	7-625-108-31	Rivet
311	3-610-198-01	Tape Guide
312	3-425-185-01	Special Screw

10-30 EXPLODED VIEW, TAPE COUNTER SYSTEM

DETAIL "E"


E-3
270
241
244
165
⊖B 3x5
W 2.6φ
133
A35
270
242
A41
N 3φ
242
SW3φ
⊕ RF 3X8
SW3φ
270
243
241
131
SW3φ
N3φ
132
SW 4φ
110
N 4φ
244
A52
270
E-3
⊕RF3x6
⊕RF 3x6

Ref NO	Part NO	Description
A35	X-36040 -14-2	Take-up Reel Table Ass'y
A41	X-36040 -30-1	Drive Wheel (T) Ass'y, take-up reel
A52	Y-20165 -52-2S	Tape Timer (Type VII) Ass'y
110	3-607 -058-01	Spacer, take-up reel table
131	3-601 -037-01	Thrust Bearer (S)
132	-039-01	Mounting, take-up reel table
133	-044-02	Take-up Reel Spindle
165	-166-01	Counter Belt (1)
241	3-605 -063-01	Pulley, tape counter
242	-064-01	Pulley Shaft, tape counter
243	-065-02	Pulley Holding Bracket
244	-067-01	Counter Belt (3)
270	3-405 -522-00	Thrust Washer, reel table

SECTION 11
PARTS LIST

11-1. MECHANICAL PARTS

Ref.No.	Part No.	Description
A1	X-36070-01-1	Capstan Base Plate Ass'y
A2	3-607-002-02*	Drum Cover
A3	X-36070-03-1	Tape Guide Deck Ass'y
A4	-04-3	Actuator Ass'y
A5	-05-2	Head Cover Ass'y
A6	X-36077-06-1	Control Panel Ass'y
1-1	3-607-007-01	Guard Holder
A7	X-36070-07-2	Reel Panel Ass'y, including
1-2	3-607-008-02	Reel Panel
2	3-601-269-01	Fastener, reel panel
3	-270-01	Spacer, reel panel
4	-281-01	Bracket, function selector knob
5	3-605-004-01	Name Plate, switch
6	3-103-526-01	Stopper, reel panel spacer
7	-947-00	Panel Washer
8	7-621-261-45	Screw (+) RF 3 x 6
9	-772-03	Screw (-) B 3 x 16, black
A8	X-36077-07-1	Cabinet Cover Ass'y including
10	3-607-009-01	Cabinet Cover
11	-714-01	Model Name Badge (C), CV-2100 ACE
12	-011-02	Reference, tape threading
13	3-601-314-01	Name Badge (A)
14	-316-02	Pad Plate (A)
15	-329-01	Caution Plate
16	3-605-015-01	Hinge (B)
17	3-103-554-00	Catch
A9	X-36070-09-3	Cabinet Body Ass'y, including
18	3-607-012-03	Cabinet Body
19	-013-02	Frame, jack
20	3-601-302-01	Pad Plate (B), cabinet body clasp
21	-304-02	Frame, ventilation
22	-305-03	Cabinet Front Sash
23	-305-04	Cabinet Rear Sash
24	-309-01	Handle with Ventilation
25	-310-01	Holding Metal (A)
26	3-602-008-02	Ventilation Frame (B)
27-1	3-605-009-01	Volume Escutcheon
27-2	0-041-220-01	AC Cord Holder
27-3	3-403-724-00	Stopper, rubber foot
28	3-605-010-01	Ventilation Plate
29	-011-01	Hinge
30	-012-01	Name Badge, SONY
31	3-605-013-02	Holding Metal (B)
32	3-103-554-00	Cabinet Cover Clasp
33	3-407-427-05	Rubber Foot
34	3-419-313-02	Cabinet Foot (B)
35	-315-02	Duct
A10	X-36070-10-3	Control Panel Sash Ass'y including
36	3-607-015-02	Control Panel Sash
37	3-604-212-03	Knob, after recording cover
38	-213-01	Spacer, sash
39	-214-02	Holder (A)
40	-224-06	Cover, sound dubbing
41	3-605-027-03	Sliding Plate (2)
42	3-103-526-01	Stop Bush
43	-947-00	Panel Washer, black
44	7-621-305-12	Screw (-) F 2 x 3
45	-559-43	" (+) K 2.6 x 6
46-1	-772-07	" (-) B 3 x 20, black
A11	X-36070-13-2	Power Switch Holding Bracket Ass'y
A12		Rotary Head Drum Ass'y, including
A13	X-36070-03-1	Tape Guide Deck Ass'y
A14		Drum Ass'y
A15	X-36070-20-1*	Flange Ass'y
A16	Y-27112-02-2	Video Head Ass'y, E01-07
46-2	3-607-021-01	Drum Mounting
46-3	-022-04*	Upper Drum
46-4	-023-04*	Lower Drum
46-5	-024-04	Drum Holder
47	-026-01	Band, guide
48	-027-01	Tapered Tape Guide (1). supply reel side
49	-028-02	Tapered Tape Guide (2), take-up reel side
50	-029-01	Tape Guide (2), take-up reel side
51	-030-01	Tape Holder
52	-032-01	Plate, prevention for Miss Tape threading
53	-033-01	Brush Holding Bracket
54	-034-01	Brush Adjusting Bracket
55	3-601-228-01	Tapered Tape Guide Retaining Bracket
56	3-607-035-02	Printed Circuit Board, brush mounting

Ref.No.	Part No.	Description
57	3-607-037-01	Brush Mounting
58	-070-01	Brush
59	-078-01	Holder, lead wire for brush
60	3-601-179-01	Special Screw, tapered tape guide (1)
61	-180-01	Special Screw, tapered tape guide (2)
62	3-607-702-01	Stopper
A17	X-27112-01-1	Slip Ring Ass'y
63	3-601-236-01 ~ -04	Spacer, flange
64	3-605-112-01	PG Coil Adjustment Spacer
65	-111-01	PG Coil Stopper
66		Rotary Head Pulley (Select any one of pulleys listed below)
	3-601-903-01	B1, 44.50φ
	-02	B2, 44.45
	-03	B3, 44.40
	-04	B4, 44.35
	-05	B5, 44.30
	-06	B6, 44.25
	-07	B7, 44.20
	-08	B8, 44.10
67	-911-01	Rotor, brake coil
68	3-607-097-02 *	Holding Bracket, 50 PG Coil
69	-069-02	Retainer, guide band
70	-070-04	Stator Holder, brake coil
71	-276-01	Washer, upper drum positioning
72	3-605-023-01	Holder, PG coil lead wire
73	1-419-012-20	Coil 2, 50 PG
74	1-452-025-11	Brake Coil
75	1-419-015-17	PG Coil, 25 PG
A18	X-36010-13-3	Fast Forward Cam (S) Ass'y
A19	-17-3	Rewind Idler (S) Ass'y
A20	-20-2	Idler Plate Ass'y
A21	X-36077-09-1	Tension Brake Control Lever Ass'y
A22	X-36010-24-1	Idler (S) Ass'y
A23	-36-2	Reel Holding Base Plate Ass'y
A24	-37-1	Reel Holder Ass'y
A25	-61-3	Holding Plate Ass'y, audio board
A26	-65-3	Capstan Wheel Ass'y

Ref.No.	Part No.	Description
A27	X-36010-67-2	Function Selector Cam Ass'y, including
A28	-12-1	Function Selector Cam (S) Ass'y
76	3-601-357-01	Special Setting Screw 4 x 10
77	0-006-050-00	Set Screw
78	0-027-207-00	Spring, pushing rod
A29	X-36077-05-1	Base Plate Ass'y, tape guide
79	3-607-703-01	Cushion
80	-704-01	Skew Control Clutch Lever
81	-705-01	Clutch Rubber
A30	X-36010-84-1	Fast Forward Spring Ass'y, including
	3-601-271-01	Fast Forward Spring
	3-420-076-01	Noise Absorber
A31	X-36077-10-1	Base Plate Ass'y
A32	X-36040-04-4	Holding Plate (3) Ass'y, circuit board
A33	-05-2	Cam Shaft Ass'y, including
82	3-604-005-02	Cam Shaft, function selector
83-1	-006-01	Cam, micro switch
83-2	7-621-261-65	Screw, (+) RF 3 x 10
A34	X-36040-09-3	Holding Plate, record button ass'y
A35	-14-2	Take-up Reel Table Ass'y
A36	-19-3	Function Selector Cover Ass'y
A37	X-36077-04-1	Band Brake Holder Ass'y
A38	X-36040-27-6	Head Shield Plate Ass'y
A40	-28-2	Pinch Lever (A) Ass'y
A41	-30-1	Drive Wheel (T) Ass'y, take-up reel
A42	X-36050-01-1	Rec. Button Stopper (2) Ass'y
A43	-02-1	Pinch Lever (B) Ass'y
A44	X-36077-01-1	Rec. Setting Lever (A) Ass'y, including
84	3-605-014-01	Holder, rec. setting lever (A)
85	-111-01	Shaft, rec. setting lever (1)
86	-112-01	Spring, rec. setting lever
87	3-601-109-01	Rec. setting lever (1)
88	7-624-105-01	Retaining Ring, E2.3
A45	X-36050-08-3	Knob Ass'y, including
89	3-605-018-01	Knob
90	3-604-285-03	Spring, knob
A46	X-00270-09-2	Idler Arm (C) Ass'y
A47	-10-4	Idler Shaft (C) Ass'y
A48	-12-0	Stepper Arm Ass'y
A49	X-36050-22-1	Supply Reel Table Ass'y

Ref.No.	Part No.	Description
A50	X-36050-23-3	Brake Lever Ass'y
A51	X-36077-11-1	Band Brake Off Lever Ass'y
A52	Y-20165-52-2S	Tape Timer (Type VII) Ass'y
91	3-607-038-05	Connector Panel
92	-039-04	Ornamental Connector Panel
93	3-605-114-01	Caution Plate (2)
94	3-607-041-02	Felt (3), AC power switch button
95	-042-01	Plate, rec. button
96	-043-01	Sash
97	-044-01	Guard
98	-084-01 -045-01	Indication Label, power voltage & Frequency -084-01; 240V 50Hz -045-01; 220V 50Hz
99	-046-01	AC Switch Cover
100	-047-02	Power Transformer Cover
101	-048-02	Control Panel Supporting Bracket
102	-731-01	Erase Head Holding Bracket (1)
103	-050-02	Power Switch Button
104	-051-01	Holding Bracket, fuse holder
105	-052-04	Chassis, power supply
106	-054-02	Fuse Indication Label (A), 1600MAT, 400MAT, 400MAT
107	-055-02	Fuse Indication Label (B), 800 MA
108	-056-01	Holding Bracket, adjustable resistor
109	-758-01	Lamp Holding Bracket, AGC lamp
110	-058-01	Spacer, take-up reel table
111	-059-01	Supply Reel Table Mounter
112	-060-02	Holding Plate, AC line lug board
113	-061-02	Cover, fuse holder
114	-062-02	Cover, AC line lug board
115	-063-01	Insulating Board, AC line lug board
116	-064-01	Spacer (A), CTL/audio head
117	-065-01	AC Receptacle Cover
118	-068-01	Heat Sink, X710
119	-069-01	Side Chassis (right)
120	-080-01	Voltage Indication Label
121	-081-03*	Video Board
122	-082-01	Actuator Guide
123	-085-02	Reinforcing Bracket (2), base plate

Ref.No.	Part No.	Description
124	3-607-086-01	Retainer, dummy coil
125		Capstan Pulley (50) (Select any one of pulleys listed below)
	-087-01	1C, 30.60ϕ
	-02	2C, 30.65
	-03	3C, 30.70
	-04	4C, 30.75
	-05	5C, 30.80
	-06	6C, 30.85
	-07	7C, 30.90
	-08	8C, 30.95
	-09	9C, 31.00
	-10	34C, 30.725
	-11	45C, 30.775
	-12	56C, 30.825
126-1	-088-01	Idler Guide (C)
126-2	-089-01	Washer, MIC IN Jack, RED
127	3-601-014-01	Side Board
128	-020-01	Angle Bracket, audio head
129	-028-04	Shield Cover (C)
130	-036-02	Supply Reel Spindle
131	-037-01	Thrust Bearer (S)
132	-039-01	Mounting, take-up reel table
133	-044-02	Take-up Reel Spindle
134	-052-02	Stepper Spring
135	-057-01	Idler Stopper
136	-058-03	Fast Forward Cam Stopper
137	-059-02	Fast Forward Reset Spring (S)
138	-060-02	Rewind Idler Reset Spring
139	-062-01	Idler Guide (S)
140-1	-068-03	Capstan
140-2	-070-01	Capstan Wheel
140-3	-357-01	Set Screw 4 x 10
140-4	0-027-236-00	Felt, capstan wheel
141	3-601-071-01	Pinch Roller
142	-081-01	Oil Retaining Ring
143	-082-01	Oil Ring
144	-083-02	Pull Rod Retainer
145	-086-01	Spacer, pinch roller spindle
146	-087-01	Spring, Pinch Roller
147	-088-02	Ball Bearing, 634ZZ
148	-090-01	Motor Fan (S)
149	-094-01	Motor Supporting Post
150	-095-02	Capstan Belt (50)

Ref.No.	Part No.	Description
151	3-601-098-01	Hum-proof Belt Mounting Bracket
152	-101-03	REC Button
153	-107-01	Spring, REC lock bar
154	-119-01	Push Rod Retainer
155	-123-02	Bushing Release, plastic clear
156	-125-02	Spring, REC switch
157	3-607-731-01	Erase Head Holding Bracket (2)
158	-733-01	Tape Guide (1)
159	-739-01	Tension Brake Off Rod
160	-708-01	Brake Band
161	-709-01	Brake Feet
162	-734-11 -01	Tape Guide (2)
163	-735-01	Spindle, guide roller (2)
164	3-601-127-01	Spring Holder
165	-166-01	Counter Belt (1)
166	-170-01	Actuator Spring
167	-256-02	Retainer, pinch roller
168	-263-01	Set Screw, head cover
169	-265-01	Supporting Stud A(1), head cover
170	-266-01	Panel Supporting Bracket
171	-280-01	Supporting Stud (2), head cover
172	-291-01	Spacer, audio head
173	-342-01	Caustion Seal, rotary head
174	-345-01	Lug, test point
175	-346-01	Release Retainer, wire, A11 and C9 board
176	-352-01	Actuator Adjusting Plate
177	-357-01	Special Setting Screw
178	3-607-736-11 -01	Tape Guide Retaining Plate
179	3-601-374-12	Slide SW Release (C9)
180	-374-22	Slide SW Release (A11)
181	-388-01	Insulating Sheet, transistor
182	-278-02	Felt (A), push button
183	-906-01	Motor Pulley (50)
184	3-604-121-01	Reinforcing Plate, motor
185	-122-01	Hum-proof Belt, capstan motor
186	-123-02	Supporting Plate, circuit board
187	-124-06*	Reinforcing Plate
188	-131-01	Capstan Shaft Bearer
189	-132-01	Head Mounting Deck
190	3-607-737-01	Guide Roller
191	3-604-141-03	Fast Forward Lever Cushion
192	-144-01	Felt (2), editing button
193	-150-01	Selector Spring

Ref.No.	Part No.	Description
194	3-604-151-01	Selector Spacer
195	-152-01	Selector
196	-153-02	Shield Cover, micro switch
197	-154-03	Change Lever, REC button
198	-155-01	Spacer, lock sliding board
199	-156-03	Spring, lock sliding board
200	-159-01	Plate, editing button
201	-160-01	Editing Button
202	-161-02	Camera Switch Button
203	-162-01	Mounting Bracket, camera switch
204	-163-02	Guide, camera switch
205	-167-01	Pushing Rod, muting switch
206	-168-03	Reset Spring, muting switch
207	-169-01	Spring Holder (2)
208	-170-02	Pull Plate, interlock
209	-171-03	Coil Spring, push plate
210	-173-02	Push Plate, interlock
211	-176-01	Mounting Bracket, micro switch
212	-178-01	Spacer, micro switch
213	-181-03	Finger Holder (B)
214	-182-04	Receptacle Metal, sash
215	-188-02	Function Selector Lever
216	-189-02	Fast Forward Lever
217	-245-01	Spring Supporting Bracket
218	-246-01	Holder, pushing rod (2)
219	-251-04	Tape Holder
220	3-607-094-01	Belt, drum
221	3-604-174-03	Pushing Rod
222	-147-04	Plate, after recording button
223	-180-02	Retainer, guide roller
224	3-605-032-01	Side Chassis (left)
225	-037-02	Meter Holding Bracket
226	-041-01	Adjustment Plate, micro switch
227	3-607-740-01	Tention Brake Off Lever
228	3-605-047-02	Ornamental Plate, knob
229	-048-01	Cushion, meter
230	3-607-741-01	Tention Arm
231	3-605-051-01	Supporter, circuit board
232	3-607-738-01	Tape Guide Spring
233	8-828-321-00	Erase Head
234	3-605-054-11	Switch Cover
235	-055-02	Reinforcing Metal, camera switch
236	-057-02	Spring, slide switch, REC
237	-058-01	Spacer, slide switch, plastic
238	-059-01	Ornamental Board, switch

Ref.No.	Part No.	Description
239	3-607-742-01	Pivot Bearing Holder
240	3-605-062-01	Adjustment Washer (B), tension arm
241	-063-01	Pulley, tape counter
242	-064-01	Pulley Shaft, tape counter
243	-065-02	Pulley Holding Bracket
244	-067-01	Counter Belt (3)
245	-072-01	Mounting Bracket, separator
246	-078-01	P.V.C. Tube, lamp (large), AGC lamp
247	-079-01	P.V.C. Tube, lamp (small)
248	-081-01	Special Set Screw 6ϕ function selector knob
249	-084-01	Spring, REC reset rod
250	-088-01	Pushing Rod
251	-102-01	Sound Dub Button
252	-103-01	Felt (4), push button
253	0-027-019-01	Idler Guide Holding Bracket
254	-035-01	Spacer 5ϕ, thin
255	-134-00	Stepper Shaft
256	-194-00	Helical Spring (E), fast forward idler
257	-200-00	Brake Block Spring
258	-216-00	Oil Ring 5ϕ, F.F. Idler Felt
259	3-607-743-01	Pivot Shaft (A)
260	7-623-221-00	Paper Washer 6ϕ
261	-236-00	Oil Absorber Ring, capstan wheel felt
262	0-051-040-00	Spring, CTL/audio head
263	-221-00	Knob Pad, REC; sound dub power switch EDIT button
264-1	-277-00	Cabinet Washer
264-2	7-624-183-11	Stop Washer C-16
265	3-001-706-02	Wire Retainer 6ϕ
266	-05	Wire Retainer 12ϕ
267	3-103-947-00	Panel Washer
268	3-401-068-01	CTL/Audio Head Adjustment Screw
269	0-041-223-01	Spacer, jack
271	3-409-102-01	P.V.C. Washer (B)
272	3-410-038-00	Spring,idler press
273	3-413-693-00	Ground Terminal (screw)
274	3-418-709-01	Indicating Plate, ground terminal
275	3-419-033-02	Idler Pushing Rod

Ref.No.	Part No.	Description
276	3-415-093-01	Brake Block (S)
277	-349-02	Handle Escutcheon
278	-350-02	Handle Cover
279	-372-11	Handle
280	3-421-126-02	Washer, REC jack, red
281	2-029-928-01	Heat Sink,X306, X309, X510
283	3-701-030-01	Deck Serial No. Label
	3-790-631-13	Instruction Manual
		Video Tape, V-30
	8-880-007-00	Reel RH-7V
284	3-601-326-02	Polyethylene Bag, main body
285	2-031-404-01	” ” AC cord
286	7-491-001-01	Desiccant
A53	X-36052-03-1	Accessory Ass'y, including
A54	X-44900-02-1	Polishing Cloth
A55	X-36010-48-1	Splicing Tape
A56	Y-20161-01-1	SONY Oil OL-1K
A57	Y-20310-01-1	Cleaning Liquid Ass'y
287	3-601-330-01	Cleaner Set
288	3-605-028-01	Accessory Box
A58	X-36050-29-1	Carton Ass'y
293	2-054-138-11	Skew Control Knob
294	3-607-744-01	Pivot Bearing
295	3-607-745-01	Spring, tension arm
296	-746-01	Nut M3
297	-747-01	Skew Control Box
298	-748-01	” ” Stopper
299	-749-01	” ” Shaft
300	-750-01	” ” Knob Shaft
301	-751-01	Spring, skew control clutch
302	-752-01	” , clutch plate
303	-753-01	Vynil Collor
304	-754-01	Skew Control Gear (1)
305	-755-01	” ” ” (2)
306	-756-01	” ” Pushing Rod
307	-757-01	Tension Lever
308	-759-01	Spring, return
309	3-610-057-01	Retainer, brake band
310	7-625-108-31	Rivet
311	3-610-198-01	Tape Guide
312	3-425-185-01	Special Screw

Note: Items marked with an asterisk(*) are not interchangeable with old parts.

11-2. ELECTRICAL PARTS

1. Video Block (Record and Playback Head Amp.) A11

Ref.No.	Part No.	Description
A11	1-538-961-11	Printed Circuit Board, A11
		Capacitors
C101	1-101-385-11	180PF ±10% 50WV Ceramic
C102	1-121-139-11	50μF 15WV Electrolytic
C103	-139-11	50μF " "
C104	-082-11	100μF " "
C301	-215-11	1μF 25WV "
C302	-138-11	30μF $\left(^{+150}_{-10}\right)$% 15WV Electrolytic
C303	1-101-118-11	0.01μF ±20% 50WV Ceramic
C304	1-121-162-11	50μF 25WV Electrolytic
C305	-144-11	20μF " "
C306	1-107-078-11	51PF ±5% 50WV Silvered Mica
C307	-074-11	36PF " " "
C308	1-141-070-11	20PF 100WV Trimmer
C309	1-101-118-11	0.01μF ±20% 50WV Ceramic
C310	-044-11	0.1μF " " "
C311	-118-11	0.01μF " " "
C312	-044-11	0.1μF " " "
C313	-044-11	0.1μF " " "
C314	1-121-179-11	10μF " 25WV Electrolytic
C315	1-101-118-11	0.01μF±20% 50WV Ceramic
C316	-044-11	0.1μF " " "
C317	-118-11	0.01μF " " "
C318	-044-11	0.1μF " " "
C319	-044-11	0.1μF " " "
C320	1-121-179-11	10μF 25WV Electrolytic
C321	1-101-509-11	0.05μF ±5% 75WV Ceramic
C322	1-141-070-11	20PF 100WV Trimmer
C323	1-109-509-11	0.05μF ±5% 75WV Ceramic
C324	1-107-076-11	43PF " 50WV Silvered Mica
C325	1-101-509-11	0.05μF " 75WV Ceramic
C326	-509-11	0.05μF ±5% " "
C327	-118-11	0.01μF ±20% 50WV "
C328	-044-11	0.1μF " " "
C329	-509-11	0.05μF ±5% 75WV "
C330	1-141-070-11	20PF 100WV Trimmer
C331	1-101-509-11	0.05μF ±5% 75WV Ceramic
C332	1-107-076-11	43PF " 50WV Silvered Mica
C333	1-101-509-11	0.05μF " 75WV Ceramic
C334	-509-11	0.05μF " " "
C335	-118-11	0.01μF " 50WV "
C336	-044-11	0.1μF ±20% " "
C337	-509-11	0.05μF ±5% 75WV "
C338	1-107-087-11	120PF " 50WV Silvered Mica
C339	1-101-118-11	0.01μF ±20% 50WV Ceramic
C340	-509-11	0.05μF ±5% 75WV "
C341	-509-11	0.05μF " " "
C342	-044-11	0.1μF ± 20% 50WV "
		Diodes
D301	8-719-353-$^{21}_{22}$	1S1532
D302	"	"
D303	"	"
D304	"	"
		Inductors
L301	1-407-177-11	470μH
L302	-177-11	"
L303	-177-11	"
L304	-177-11	"
L305	-322-11	15.4 - 40μH, variable
L306	-322-11	" "
L307	-322-11	" "
L308	-176-11	390μH
LPF101	1-231-059-11	Low Pass Filter
SW301	1-513-317-11	Slide Switch
		Resistors
R101	1-250-881-11	2.2K ohms ±5% RD12T Carbon
R102	-871-11	820 " " " "
R103	-893-11	6.8K " " " "
R104	-912-11	43K " " " "
R105	-851-11	120 " " " "
R106	-873-11	1K " " " "
R107	-873-11	1K " " " "
R108	-897-11	10K " " " "
R109	-857-11	220 " " " "
R110	-875-11	1.2K " " " "

Ref.No.	Part No.		Description
R111	1-250-873-11	1K	ohms ±5% RD12T Carbon
R112	-871-11	820	” ” ” ”
R301	1-221-495-11	1K	” adjustable
R302	1-250-877-11	1.5K	” ±5% RD12T Carbon
R303	-889-11	4.7K	” ” ” ”
R304	-870-11	750	” ” ” ”
R305	1-221-495-11	1K	” , adjustable
R306	1-250-886-11	3.6K	” ±5% RD12T Carbon
R307	-873-11	1K	” ” ” ”
R308	-866-11	510	” ” ” ”
R309	-849-11	100	” ” ” ”
R310	-846-11	75	” ” ” ”
R311	-875-11	1.2K	” ” ” ”
R312	-863-11	390	” ” ” ”
R313	-886-11	3.6K	” ” ” ”
R314	1-221-494-11	500	” , adjustable
R315	1-250-886-11	3.6K	” ±5% RD12T Carbon
R316	-845-11	68	” ” ” ”
R317	1-221-493-11	200	” , adjustable
R318	1-250-873-11	1K	” ±5% RD12T Carbon
R319	-863-11	390	” ” ” ”
R320	1-221-493-11	200	” , adjustable
R321	-493-11	200	” , ”
R322	1-250-893-11	6.8K	” ±5% RD12T Carbon
R323	-917-11	68K	” ” ” ”
R324	-847-11	82	” ” ” ”
R325	-873-11	1K	” ” ” ”
R326	-871-11	820	” ” ” ”
R327	-873-11	1K	” ” ” ”
R328	-856-11	200	” ” ” ”
R329	1-250-891-11	5.6K	” ” ” ”
R330	-897-11	10K	” ” ” ”
R331	1-210-088-11	33	” ” RD1SP ”
R332	1-250-861-11	330	” ” RD12T ”
R333	1-204-739-11	100	” ” RD2SP ”
R334	1-250-849-11	100	” ” RD12T ”
R335	-893-11	6.8K	” ” ” ”
R336	-917-11	68K	” ” ” ”
R337	-847-11	82	” ” ” ”
R338	-873-11	1K	” ” ” ”
R339	-871-11	820	” ” ” ”
R340	-873-11	1K	” ” ” ”
R341	-856-11	200	” ” ” ”
R342	-891-11	5.6K	” ” ” ”
R343	-897-11	10K	” ” ” ”

Ref.No.	Part No.		Description
R344	1-210-088-11	33	ohms ±5% RD1SP Carbon
R345	1-250-861-11	330	” ” RD12T ”
R346	1-204-739-11	100	” ” RD2SP ”
R347	1-250-849-11	100	” ” RD12T ”
R348	1-240-401-11	1	” ” ” ”
R349	1-250-889-11	4.7K	” ” ” ”
R350	1-250-916-11	62K	” ” ” ”
R351	1-221-610-11	3K	” , adjustable
R352	1-250-880-11	2K	” ±5% RD12T Carbon
R353	-845-11	68	” ” ” ”
R354	-887-11	3.9K	” ” ” ”
R355	-889-11	4.7K	” ” ” ”
R356	-897-11	10K	” ” ” ”
R357	-880-11	2K	” ” ” ”
R358	877-11	1.5K	” ” ” ”
R359	-880-11	2K	” ” ” ”
R360	1-240-401-11	1	” ” ” ”
R361	1-250-889-11	4.7K	” ” ” ”
R362	-916-11	62K	” ” ” ”
R363	1-221-610-11	3K	” , adjustable
R364	1-250-880-11	2K	” ±5% RD12T Carbon
R365	-845-11	68	” ” ” ”
R366	-887-11	3.9K	” ” ” ”
R367	-889-11	4.7K	” ” ” ”
R368	-897-11	10K	” ” ” ”
R369	-880-11	2K	” ” ” ”
R370	-877-11	1.5K	” ” ” ”
R371	-880-11	2K	” ” ” ”
R372	1-221-492-11	100K	” adjustable
R373	1-250-889-11	4.7K	” ±5% RD12T Carbon
R374	-913-11	47K	” ” ” ”
R375	-846-11	75	” ” ” ”
R376	-846-11	75	” ” ” ”
R377	-880-11	2K	” ” ” ”
R378	1-221-496-11	2K	” , adjustable
R379	1-250-867-11	560	” ±5% RD12T Carbon
R380	-863-11	390	” ” ” ”
R381	-863-11	390	” ” ” ”
		Transformers	
T301	1-425-384-11	Interstage Transformer TL	
T302	-385-11	Input Transformer T (A)	
T303	-385-11	” ” T (A)	

Ref. No.	Part No.	Description
		Transistors
X101	8-723-132-20	2SC318A-132
X102	-132-20	”
X103	-132-20	”
X301	-132-20	”
X302	8-726-251-00	2SC629-51
X303	-251-00	”
X304	8-723-132-20	2SC318A-132
X305	-132-20	”
X306	8-727-564-00	2SC756-4
X307	8-723-132-20	2SC318A-132
X308	-132-20	”
X309	8-727-564-46	2SC765-4
X310	8-726-336-00	2SC633-6
X311	8-724-334-00	2SC403A-4
X312	-334-20	”
X313	8-726-336-00	2SC633-6
X314	8-726 -334-00	2SC403A-4
X315	8-724-334-00	2SC403A-4
X316	-334-00	”
X317	-334-00	”

2. Video Block (Playback Amp.) A12

Ref.No.	Part No.	Description
A12	1-538-962-11	Printed Circuit Board, A12
		Capacitors
C401	1-101-118-11	0.01μF ±20% 50WV Ceramic
C402	-044-11	0.1μF ” ” ”
C403	-118-11	0.01μF ” ” ”
C404	-044-11	0.1μF ” ” ”
C405	-044-11	0.1μF ” ” ”
C406	-044-11	0.1μF ” ” ”
C407	-455-11	0.001μF ” ” ”
C408	-044-11	0.1μF ” ” ”
C409	-455-11	0.001μF ” ” ”
C410	-044-11	0.1μF ” ” ”
C411	-044-11	0.1μF ” ” ”
C412	-455-11	0.001μF ” ” ”
C413	-044-11	0.1μF ” ” ”
C414	-044-11	0.1μF ” ” ”
C415	-455-11	0.001μF ” ” ”
C416	-509-11	0.05μF ±5% 75WV ”
C417	-044-11	0.1μF ±20% 50WV ”
C418	1-121-051-11	100μF 6WV Electrolytic
C419	-139-11	50μF 15WV ”
C420	-139-11	50μF ” ”
C421	1-121-162-11	50μF 25WV Electrolytic
C422	1-101-385-11	180PF ±10% 75WV Ceramic
C423	1-121-051-11	100μF 6WV Electrolytic
C424	-051-11	” ” ”
C425	-162-11	50μF 25WV ”
C426	1-101-833-11	470PF ±10% 50WV Ceramic
C427	-833-11	470PF ” ” ”
C428	-490-11	0.02μF ±5% ” ”
C429	1-121-138-11	30μF $\left(^{+150}_{-10}\right)\%$ 15WV Electrolytic
C430	-162-11	50μF 25WV ”
C431	-110-11	30μF 10WV ”
C432	-150-11	5μF 25WV ”
C433	-150-11	5μF ” ”
C434	-162-11	50μF ” ”
C435	1-101-044-11	0.1μF ±20% 50WV Ceramic
C436	1-121-162-11	50μF 25WV Electrolytic
C437	1-101-117-11	200PF ±5% 50WV Ceramic
C438	1-121-139-11	50μF 15WV Electrolytic
C439	-150-11	5μF 25WV ”
C440	1-101-490-11	0.02μF ±5% 50WV Ceramic
C441	-118-11	0.01μF ±20% ” ”
C442	-118-11	0.01μF ” ” ”
C443	1-121-162-11	50μF 25WV Electrolytic
C444	-215-11	1μF ” ”
C445	-215-11	1μF ” ”
		Diodes
D401	8-719-353-$^{21}_{22}$	1S1532$^{A}_{B}$
D402	”	”
D403	”	”
D404	”	”
D405	”	”
D406	”	”
D407	”	”
D408	”	”
D409	”	”
D410	”	”
D411	”	”
D412	”	”
D413	”	”
D414	”	”
D415	8-719-722-11	1T22
	-12	1T22A
D416	8-719-722-11	1T22
	-12	1T22A
LPF401	1-231-065-12	CV Low Pass Filter, 2CE

Ref.No.	Part No.	Description
		Resistors
R401	1-250-893-11	6.8K ohms ±5% RD12T Carbon
R402	-919-11	82K " " " "
R403	-846-11	75 " " " "
R404	-875-11	1.2K " " " "
R405	-855-11	180 " " " "
R406	-897-11	10K " " " "
R407	-907-11	27K " " " "
R408	-873-11	1K " " " "
R409	-893-11	6.8K " " " "
R410	-921-11	100K " " " "
R411	-852-11	130 " " " "
R412	-875-11	1.2K " " " "
R413	-855-11	180 " " " "
R414	-893-11	6.8K " " " "
R415	-921-11	100K " " " "
R416	-852-11	130 " " " "
R417	-875-11	1.2K " " " "
R418	-893-11	6.8K " " " "
R419	-921-11	100K " " " "
R420	-852-11	130 " " " "
R421	-875-11	1.2K " " " "
R422	-855-11	180 " " " "
R423	-893-11	6.8K " " " "
R424	-921-11	100K " " " "
R425	-852-11	130 " " " "
R426	-875-11	1.2K " " " "
R427	-855-11	180 " " " "
R428	1-221-493-11	200 " , adjustable
R429	1-250-897-11	10K " ±5% RD12T Carbon
R430	-904-11	20K " " " "
R431	-877-11	1.5K " " " "
R432	-853-11	150 " " " "
R433	-906-11	24K " " " "
R434	-877-11	1.5K " " " "
R435	1-221-492-11	100 " , adjustable
R436	1-250-882-11	2.4K ohms ±5% RD12T Carbon
R437	-849-11	100 " " " "
R438	-873-11	1K " " " "
R439	-875-11	1.2K " " " "
R440	-901-11	15K " " " "
R441	1-209-860-11	560 " " RD1SP "
R442	1-250-851-11	120 " " RD12T "
R443	-877-11	1.5K " " " "
R444	1-221-496-11	2K ", adjustable
R445	-496-11	2K ", "
R446	1-221-498-11	10K ohms, adjustable
R447	1-250-907-11	27K " ±5% RD12T Carbon
R448	-893-11	6.8K " " " "
R449	-906-11	24K " " " "
R450	873-11	1K " " " "
R451	1-209-860-11	560 " " RD1SP "
R452	1-250-833-11	22 " " RD12T "
R453	-875-11	1.2K " " " "
R454	-875-11	1.2K " " " "
R455	-906-11	24K " " " "
R456	846-11	75 " " " "
R457	-880-11	2K " " " "
R458	-890-11	5.1K " " " "
R459	-866-11	510 " " " "
R460	-897-11	10K " " " "
R461	-899-11	12K " " " "
R462	-877-11	1.5K " " " "
R463	-893-11	6.8K " " " "
R464	-873-11	1K " " " "
R465	-868-11	620 " " " "
R466	-849-11	100 " " " "
R467	-921-11	100K " " " "
R468	-889-11	4.7K " " " "
R469	-889-11	4.7K " " " "
R470	-913-11	47K " " " "
R471	-855-11	180 " " " "
R472	-877-11	1.5K " " " "
R473	-873-11	1K " " " "
R474	-879-11	1.8K " " " "
R475	-903-11	18K " " " "
R476	-935-11	390K " " " "
R477	-901-11	15K " " " "
R478	-899-11	12K " " " "
R479	-899-11	12K " " " "
R480	-851-11	120 " " " "
T401	1-425-202-12	Interstage Transformer B
		Transistor
X401	8-723-214-20	2SC318A-142
X402	-214-20	"
X403	-214-20	"
X404	-214-20	"
X405	-214-20	"

Ref. No.	Part No.	Description
X406	8-723-214-20	2SC318A-142
X407	8-724-334-00	2SC403A-4
X408	-334-00	”
X409	-334-00	”
X410	-334-00	”
X411	8-727-562-20	2SC756-622
X412	8-724-334-20	2SC403A-4
X413	-334-00	”
X414	8-723-214-20	2SC318A-142
X415	-723-20	2SC352A-232
X416	8-724-334-00	2SC403A-4

3. Servo and Power Supply Block B 5

Ref.No.	Part No.	Desciption
B5	1-538-717-13	Printed Circuit Board, B5
		Capacitors
C105	1-121-215-11	1μF 25WV Electrolytic
C106	-110-11	30μF 10WV ”
C107	1-105-671-11	0.0068uF ±10% 50WV Mylar
C108	1-121-215-11	1μF 25WV Electrolytic
C109	-162-11	50μF 25WV ”
C110	-215-11	1μF ” ”
C111	-179-11	10μF ” ”
C501	1-101-044-11	0.1μF ±20% 50WV Ceramic
C502	1-121-192-11	10μF 15WV Electrolytic
C503	-106-11	5μF 6WV ”
C504	1-101-044-11	0.1μF ±20% 50WV Ceramic
C505	1-121-192-11	10μF 15WV Electrolytic
C506	-192-11	10μF ” ”
C507	-179-11	10μF 25WV ”
C511	-151-11	100μF 25WV ”
C512	1-101-488-11	0.02μF ±5% 75WV Ceramic
C513	1-121-102-11	30μF 6WV Electrolytic
C514	1-127-084-11	1μF ±20%25WV Aluminium Electrolytic
C515	1-121-215-11	1μF 25WV Electrolytic
C516	-215-11	1μF ” ”
C517	1-105-681-11	0.047μF ±10%50WV Mylar
C519	1-101-044-11	0.1μF ±20% 50WV Ceramic
C520	1-121-192-11	10μF 15WV Electrolytic
C522	1-121-215-11	1μF 25WV Electrolytic
C523	1-101-488-11	0.02μF ±5% 75WV Ceramic
C524	1-121-268-11	10μF 35WV Electrolytic
C525	1-101-118-11	0.01μF ±20% 50WV Ceramic
		Diodes
D502	1-710-221-00	1T22
D503	-221-00	”
D505	1-710-112-10	1T22
D506	8-719-941-10	DS-1M (1S-121
D507	-112-10	”
D508	8-719-113-10	RD-13A
		Resistors
R113	1-250-909-11	33K ohms ±5% RD12T Carbon
R114	-931-11	270K ” ” ” ”
R115	-885-11	3.3K ” ” ” ”
R116	-905-11	22K ” ” ” ”
R117	-889-11	4.7K ” ” ” ”
R118	-897-11	10K ” ” ” ”
R119	-927-11	180K ” ” ” ”
R120	-875-11	1.2K ” ” ” ”
R121	-899-11	12K ” ” ” ”
R122	-907-11	27K ” ” ” ”
R123	-866-11	510 ” ” ” ”
R124	-900-11	12K ” ” ” ”
R125	-855-11	180 ” ” ” ”
R501	-881-11	2.2K ” ” ” ”
R502	-893-11	6.8K ” ” ” ”
R503	-895-11	8.2K ” ” ” ”
R504	-923-11	120K ” ” ” ”
R505	-881-11	2.2K ” ” ” ”
R506	-897-11	10K ” ” ” ”
R507	-881-11	2.2K ” ” ” ”
R508	-881-11	2.2K ” ” ” ”
R509	-930-11	240K ” ” ” ”
R510	-849-11	100 ” ” ” ”
R511	-897-11	10K ” ” ” ”
R512	-855-11	180 ” ” ” ”
R521	-921-11	100K ” ” ” ”
R522	-889-11	4.7K ” ” ” ”
R523	-905-11	22K ” ” ” ”
R524	-909-11	33K ” ” ” ”
R525	1-221-681-11	50K ” , adjustable

Ref.No.	Part No.	Description
R526	1-250-909-11	33K ohms ±5% RD12T Carbon
R527	-865-11	470 " " " "
R528	-889-11	4.7K " " " "
R529	-899-11	12K " " " "
R530	-921-11	100K " " " "
R531	-909-11	33K " " " "
R532	-897-11	10K " " " "
R533	-857-11	220K " " " "
R534	-877-11	1.5K " " " "
R535	-930-11	240 K " " " "
R536	1-221-369-11	250K " , adjustable
R537	1-250-833-11	22 " ±5% RD12T Carbon
R538	-894-11	7.5K " " " "
R539	-885-11	3.3K " " " "
R540	-891-11	5.6K " " " "
R541	1-221-497-11	5K " , adjustable
R542	1-250-891-11	5.6K " ±5% RD12T Carbon
R543	-869-11	680 " " " "
R544	-881-11	2.2K " " " "
T501	1-423-071-11	Pulse Transformer 25PG, T501
S501	8-690-006-00	S1250, thermistor
SW501	1-513-367-11	Slide Switch SW501
		Transistors
X104	8-723-216-20	2SC-318A-162
X105	-223-20	2SC-318A-232
X106	-223-20	"
X501	-216-20	2SC403A-6
X502	8-724-334-00	2SC403A-4
X505	-334-00	"
X506	-334-00	"
X507	-334-00	"
X508	-334-00	"
X509	8-723-215-20	2SC318A-152
X510	8-727-563-46	2SC756-634
X511	-562-40	2SC756-624
X512	8-723-214-20	2SC318A-142
X513	8-724-334-00	2SC403A

4. Audio Block C 9

Ref.No.	Part No.	Description
C9	1-538-514-23	Printed Circuit Board, C9
		Capacitors
C601	1-121-101-11	30µF 3WV Electrolytic
C602	1-105-661-12	0.001µF ±10% 50WV Mylar
C603	1-121-111-11	100µF 3WV Electrolytic
C604	1-101-044-12	0.1µF ±20% 50WV Ceramic
C605	1-121-121-11	200µF 12WV Electrolytic
C606	-110-11	30µF 10WV "
C607	1-105-675-12	0.01µF ±10% 50WV Mylar
C608	1-121-128-11	50µF 10WV Electrolytic
C609	-105-11	10µF " "
C610	-105-11	10µF " "
C611	-051-11	100µF 6WV "
C612	-105-11	10µF 10WV "
C613	1-101-423-11	500PF ±20% 50WV Ceramic
C614	1-121-082-11	100µF 15WV Electrolytic
C615	1-105-677-12	0.022µF ±10% 50WV Mylar
C616	1-121-186-11	1000µF 12WV Electrolytic
C617	-124-11	50µF 3WV "
C618	-173-11	200µF 15WV "
C619	-110-11	30µF 10WV "
C620	-124-11	50µF 3WV "
C621	1-105-667-12	0,0033µF ±10% 50WV Mylar
C622	1-121-151-11	100µF 25WV Electrolytic
C623	1-105-673-12	0.01µF ±10% 50WV Mylar
C624	1-141-069-11	20 - 120PF Trimmer
C625	1-129-013-00	0.0015µF ±10% 600WV Polystyrol
		Diodes
D601	8-710-221-00	1T22
D602	-221-00	"
D603	-221-00	"
L601	1-409-038-12	Coil, trap
		Resistors
R601	1-250-905-11	22K ohms ±5% RD12T Carbon
R602	-914-11	51K " " " "
R603	-847-11	82 " " " "
R604	-896-11	9.1K " " " "
R605	-903-11	18K " " " "
R606	-903-11	18K " " " "
R607	-897-11	10K " " " "
R608	-903-11	18K " " " "
R609	-897-11	10K " " " "
R610	-857-11	220 " " " "
R611	-890-11	5.1K " " " "
R612	-883-11	2.7K " " " "
R613	1-221-497-11	5K " , adjustable
R614	-681-11	50K " "
R615	1-250-895-11	8.2K " ±5% RD12T Carbon

Ref.No.	Part No.	Description
R616	1-250-897-11	10K ohms ±5% RD12T Carbon
R617	-909-11	33K " " " "
R618	-843-11	56 " " " "
R619	-877-11	1.5K " " " "
R620	-888-11	4.3K " " " "
R621	-899-11	12K " " " "
R622	-888-11	4.3K " " " "
R623	-873-11	1K " " " "
R624	-888-11	4.3K " " " "
R625	-861-11	330 " " " "
R626	-825-11	10 " " " "
R627	-915-11	56K " " " "
R628	-941-11	680K " " " "
R629	-923-11	120K " " " "
R630	-891-11	5.6K " " " "
R631	-907-11	27K " " " "
R632	-875-11	1.2K " " " "
R633	1-221-497-11	5K " , adjustable
R634	1-250-877-11	1.5K " ±5% RD12T Carbon
R635	-897-11	10K " " " "
R636	1-204-524-11	330 " " RD1SP "
R637	1-250-905-11	22K " " RD12T "
R638	-875-11	1.2K " " " "
R639	1-201-401-11	2.2 " ±10% RC¼L Composition
R640	-401-11	2.2 " " " "
SW601	1-513-317-11	Slide Switch, SW601
		Transformer
T601	1-427-199-11	Output
T602	1-423-115-11	Input
T603	-072-12	Oscillator
		Transistors
X601	8-726-316-00	2SC631-6
X602	-316-00	"
X603	-316-00	"
X604	8-721-324-00	2SB-382-2
X605	-322-00	2SB-381-3
X606	-353-00	2SB-383-1
X607	-353-00	2SB-383-1

5. Video AGC Block R

Ref.No.	Part No.	Description
R	1-538-618-22	Printed Circuit Board, R
		Capacitors
C201	1-121-128-11	50μF 10WV Electrolytic
C202	-145-11	1μF 6WV "
C203	-131-11	3μF " "
C204	1-121-106-11	5μF 6WV Electrolytic
C205	1-101-058-11	0.005μF ±20% 50WV Ceramic
C206	1-121-295-11	200μF 6WV Electrolytic
C207	1-103-613-11	330PF ±5% 50WV Polystyrol
C208	1-121-122-11	50μF 12WV Electrolytic
C209	-110-11	30μF 10WV "
C210	1-101-833-11	470PF ±5% 50WV Ceramic
C211	1-121-127-11	20μF 10WV Electrolytic
C212	-138-11	30μF 15WV "
C213	-173-11	200μF 15WV "
		Diodes
D201	8-719-353-20	1S1532
D202	-353-20	"
D203	-113-01	ZBI-14
		Resistors
R201	1-221-492-11	100 ohms, adjustable
R202	1-209-789-11	82 " ±5% RD½SP Carbon
R203	1-204-472-11	1K " " " "
R204	-475-11	2K " " " "
R205	1-221-495-11	1K " , adjustable
R206	1-204-479-11	5.1K " ±5% RD½SP Carbon
R207	-460-11	100 " " " "
R208	-470-11	510 " " " "
R209	-799-11	560 " " " "
R210	-463-11	200 " " " "
R211	-470-11	510 " " " "
R212	-481-11	6.8K " " " "
R213	-493-11	39K " " " "
R214	-461-11	150 " " " "
R215	-472-11	1K " " " "
R216	-481-11	6.8K " " " "
R217	-493-11	39K " " " "
R218	-461-11	150 " " " "
R219	1-221-495-11	1K " , adjustable
R220	1-204-603-11	300 " ±5% RD½SP Carbon
R221	-149-11	3K " " " "
R222	1-209-163-11	270 " " RD1P "
S201	8-690-001-00	S10K Thermistor

Ref. No.	Part No.	Description
		Transistors
X201	8-724-324-00	2SC403A-4
X202	8-723-213-20	2SC318A-132
X203	8-726$^{-543}_{-553}$-10	2SC657-$^{431}_{531}$)
X204	8-724-324-00	2SC403A-4
X205	8-724-324-00	”

6. General Item Block

Ref.No.	Part No.	Description
N-1	1-538-598-12	Printed Circuit Board N1, muting switch, SW707
N-2	1-538-598-12	Printed Circuit Board N2, recording button SW708
U	1-538-620-1	Printed Circuit Board U, TV-CAM switch, SW707
W	1-538-621-11	Printed Circuit Board W, AGC-Manual Switch
B1	1-538-623-11	Printed Circuit Board B1, PG coil lead wire junction
B2	1-538-624-11	Printed Circuit Board B2, level indicator lead wire junction
B3	1-538-634-11	Printed Circuit Board B3, dummy coil mounting
		Capacitors
C701	1-109-015-00	2000PF 1000WV Mica
C702	1-117-037-22	1 5μF +0.5μF 300WV Metalized Paper
C703	-037-22	”
C704	1-121-073-11	1000μF 35WV Electrolytic
C705	$^{-075}_{-074}$-11	1000μF 50WV Electrolytic
CN701	1-509-015-01	AC Outlet, TV camera
CN702		AC Socket, (No. 6061-2) AC Cord with Plug, (No. 3020)
CN703	1-509-081-11	Connector, M type
CN704	-081-11	” ”
CN705	1-507-096-11	QGS Jack
CN706	-108-11	Phono Jack, E type
CN707	-108-11	” ”
CN708	1-509-095-11	Socket, 8P
CN709	1-526-063-11	Connector, 6P special

Ref.No.	Part No.	Description
CN710 -1	1-506-140-12	12P Short Plug
CN710 -2	1-509-061-11	12P Socket, duplicator
M701	1-524-032-21	Level Meter, M701
L701	1-407-090-11	Dummy Coil, L701
		Resistors
R701	1-221-873-11	Variable Resistor,5K ohms, audio level control
R702 SW710	-598-11	Variable Resistor with Switch, 500 ohms, video level control
R703	1-250-866-11	510 ohms ± 5% RD12T Carbon
R704	1-223-009-11	Variable Resistor, 500 ohms, Wire wound
R707	1-209-898-11	510 ohms ±5% RD1SP carbon
R708	1-223-009-11	500 ohms, adjustable
R709	1-250-846-11	75 ohms, ±5% RD12T Carbon
SW701	1-513-347-11	Slide Switch, SW701
SW702	-228-11	” ” , SW702
SW703	1-514-257-12	Switch, push button
SW704	-137-11	MR Switch
SW705	-093-11	Micro Switch
SW706	-093-11	” ”
SW707	-255-11	Slide Switch
SW708	255-11	” ”
SW709	-039-12	Micro Switch
SW711	-192-11	Power Switch, SEMKO
SW712	-137-11	MR Switch
SW713	-039-12	Micro Swtich
SW714	-039-12	” ”
T701	1-441-361-12	Power Transformer
		Transistor
X701	8-720$^{-465-81}_{-466-81}$	2SD46-$^{5}_{6}$
PP30-2102C2	8-821-221-03	Audio and Servo Control Head PP30-2102C2
EF69-2102	8-828-321-20	Erase Head, EF69-2102
M	8-831-024-00	Motor HC-024

Ref.No.	Part No.	Description
F701	1-532-053-11	Fuse 1.6A, SEMKO 100V - 240V
F702	-078-11	Fuse 1000MAT, SEMKO, 32V
F703	-078-11	" "
F704	-066-11	Fuse 400MAT, SEMKO 100V, 6.3V
F705	-066-11	" "
PL701	1-518-012-04	Pilot Lamp
PL702	-012-04	" " , EE
PL703	-012-04	" " , AGC
289	1-517-003-00	Pilot Lamp Holder
290	1-533-026-11	Fuse Holder 3P
291	1-536-030-00	Lug, 1L4P
292	1-536-176-11	Lug, 5P, voltage select
CR701	1-231-057-12	Encapsulated Component (120Ω + 0.033μF)

Ref.No.	Part No.	Description

SONY®

CV-2100ACE

SERVICE MANUAL SUPPLEMENT

No. 1

SEP, '69

SUBJECT	:	Service Manual Correction
APPLICABLE SERIAL NUMBER	:	10,001 and later

Your manual should be corrected.

Replace the pages for the correction.

attached:	corrections on pages 2-3, 2-4, 2-5, 2-6, 5-5, 5-6, 6-1, 6-2, 6-3, and 6-4.

SONY CORPORATION

3B0910-5

Printed in Japan

SONY

CV-2100ACE

SERVICE MANUAL SUPPLEMENT

No.2

OCT. '69

SUBJECT : Picture resolution improvement

APPLICABLE SERIAL NUMBER : 10,601 and later

1. INTRODUCTION

Starting with serial number 10,601, CV-2100 ACE's have been changed with H chassis mark* to improve picture resolution and servo control. (* See Fig. 1.)

2. DESCRIPTION OF THE MODIFICATION

"A11", "A12" and "B5" printed circuit boards have been changed. The schematic diagram and layout of printed circuit boards are given in sections 2-1, 2-2 and 2-3.

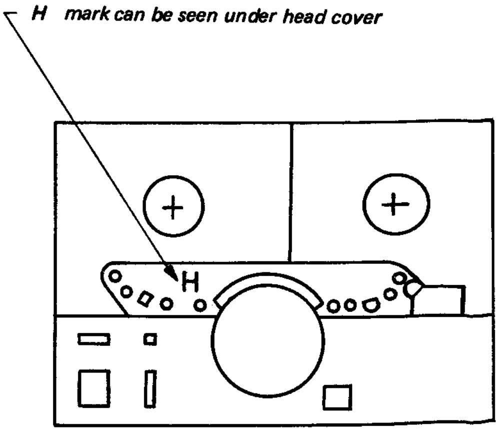
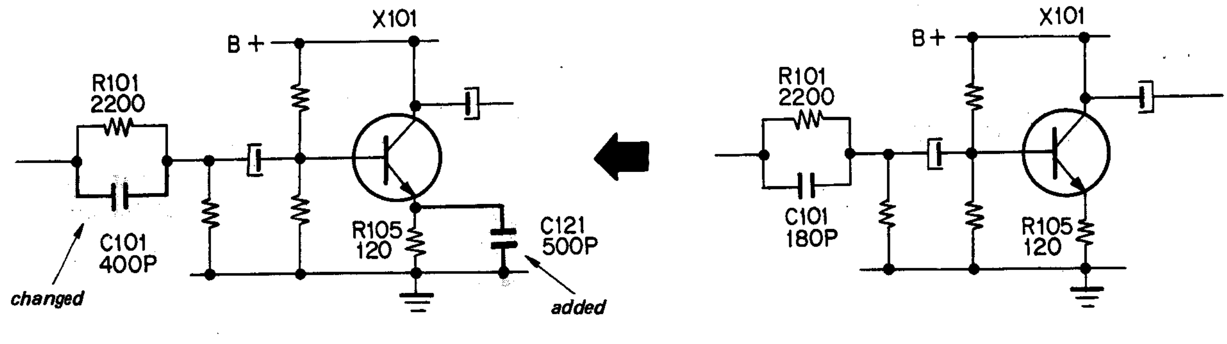


Fig. 1. "H" chassis mark

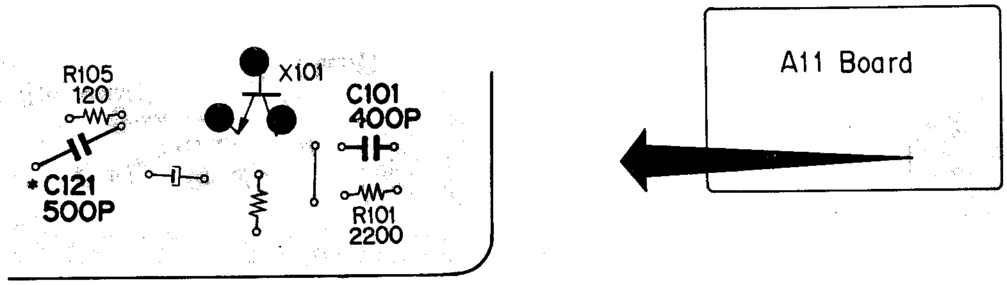
2-1. A11 Board Modification


X101
B+
R101
2200
C101
400P
changed
R105
120
C121
500P
added
X101
B+
R101
2200
C101
180P
R105
120

(new circuit)

(former circuit)

Fig. 2. Circuit modification (1)


R105
120
X101
C101
400P
*C121
500P
R101
2200
A11 Board

* *C121 mounted on conductor side*

Fig. 3. A11 Board modification

New Parts Required:

Ref. No.	Remarks	New Parts		Former Parts
		Value	Part No.	
C101	changed	400 pF	1-101-091-11 (ceramic)	180 pF
C121	added	500 pF	1-101-421-11 (ceramic)	——

SONY®
SERVICE MANUAL

CV-2100ACE

SUPPLEMENT

No. 3
JULY, 1970

SUBJECT:

- (1) Reinforcement beam addition
  Serial No. 11381 and later
- (2) Audio AGC gain change
  Serial No. 12201 and later
  "J" mark modification
- (3) Video amplifier characteristics change
  Serial No. 12501 and later
  "K" mark modification
- (4) Shield cover addition
- (5) Tape interchangeability in CV-2100ACEs

"J" or "K" mark can be seen under head cover.

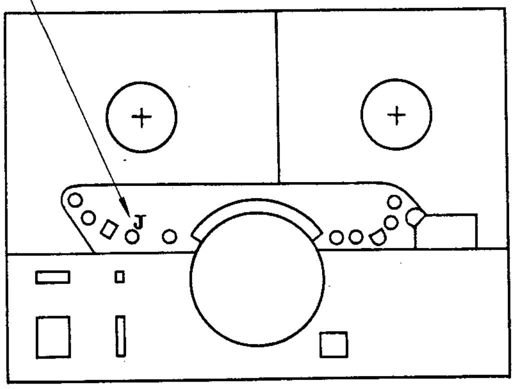


Fig. 1

(1) Reinforcement beam addition; applied to the VTR No. 11381 and later.

Left foot is changed from 3-605-032-01 to X-36077-13-2

Right foot is changed from 3-607-069-02 to X-36077-14-1

PCB bracket(2) is changed from 3-607-085-03 to chassis reinforcement, 3-607-717-01 (Fig. 2)

Cabinet ass'y is changed from X-36077-08-1 to X-36077-08-2

Reinforcement 3-607-720-01 1 piece is added in the bottom of the VTR (Fig. 3)

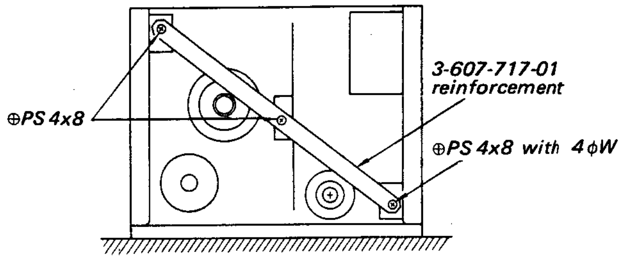

⊕PS 4x8
3-607-717-01 reinforcement
⊕PS 4x8 with 4φW

Fig. 2

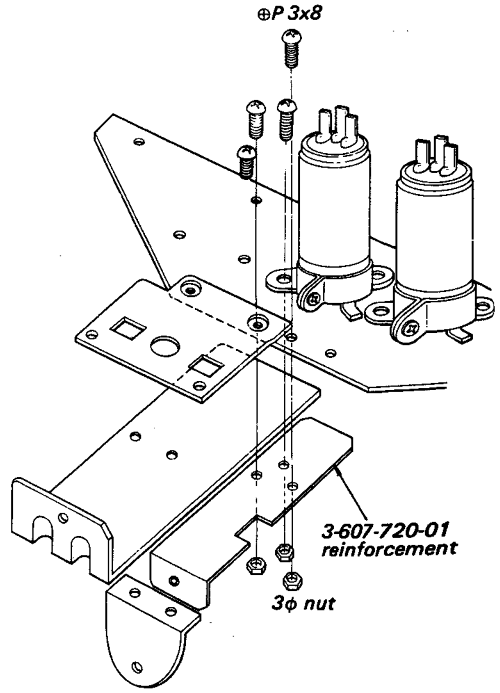

⊕P 3x8
3-607-720-01 reinforcement
3φ nut

Fig. 3

(2) Audio AGC gain is boosted; "J" modification; applied to the VTR No. 12201 and later

R610 is changed from 220Ω to 68Ω.

(3) Video amplifier characteristics is changed; "K" modification; applied to the VTR No. 12501 and later

- o R354, R366 is changed from 3900Ω to 1300Ω
- o R375 is changed from 75Ω to 150Ω
- o R376 is changed from 75Ω to 5.6Ω
- o R458 is changed from 5100Ω to 15 kΩ
- o R491 is changed from 2200Ω to 1200Ω
- o L308 is changed from 390μH to 1.5 mH
- o C339 is changed from 0.01μF to 2200 pF
- o C343, C344 120 pF is added.
- o C422 is changed from 68 pF to 91 pF
- o C451 is changed from 270 pF to 390 pF

(4) Shield cover (3-607-770-01) is added No. 12501 and later

Location: front of the VTR

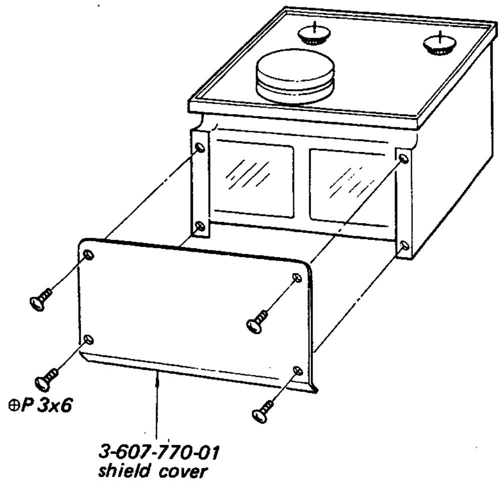


Fig. 4

(5) Tape interchangeability between CV-2100CE AND CV-2100ACE'S RECORDED TAPE

Introduction: Overmodulation in playback picture can sometimes seen on the monitor when a tape recorded by CV-2100ACE is played back by CV-2100CE. Remove the overmodulation by the following procedures.

Procedure 1.
- (i) Remove cabinet and playback the tape.
- (ii) Connect scope to TP3 in 0.2V/cm and 5 ms/cm.
- (iii) Adjust the position of the audio/CTL head until playback output waveform is flat.

If overmodulation still exists, proceed to procedure 2.

Procedure 2.
- (i) Connect monitor TV and playback the tape.
- (ii) Adjust C330 and C322 for minimum overmodulation and flicker on monitor.

If overmodulation still exists, proceed to procedure 3.

Procedure 3.
- (i) Adjust R351, R363, L305 and L306 for minimum overmodulation.

If overmodulation still exists, proceed to procedure 4.

Procedure 4.
- (i) Change R354 and R366 from 3900 ohms to 1300 ohms
- (ii) R375 from 75 ohms to 150 ohms
- (iii) R376 from 75 ohms to 5.6 ohms
- (iv) L308 from 390μH to 1.5 mH
- (v) C339 from 0.01μF to 2200 pF
- (vi) Add C343 and C344 120 pF.

Procedure 4 is the same as "K" modification.

SONY CORPORATION

Printed in Japan

SONY®
SERVICE MANUAL

CV-2100ACE

IMPORTANT

SUPPLEMENT

No. 4
MARCH, 1971

SUBJECT:

(1) Correction of SERVICE MANUAL Fig. 5-2 Video head assembly mounting position after Serial No. 24391.

(2) Correction of SERVICE MANUAL Fig. 5-8 Measuring tape tension at the supply reel.

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(1) Correction of SERVICE MANUAL Fig. 5-2 Video head assembly mounting position.

Position of the Pole Pieces is changed.

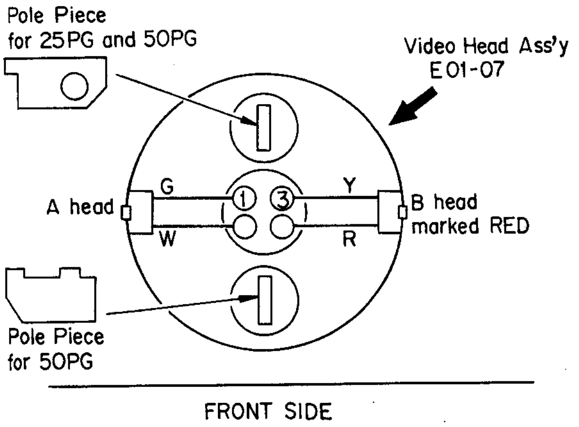
Pole Piece
for 25PG and 50PG
Video Head Ass'y
E01-07
A head
G
Y
①
③
W
R
B head
marked RED
Pole Piece
for 50PG
FRONT SIDE

Fig. 1. Video Head Ass'y Mounting Position

Wrong

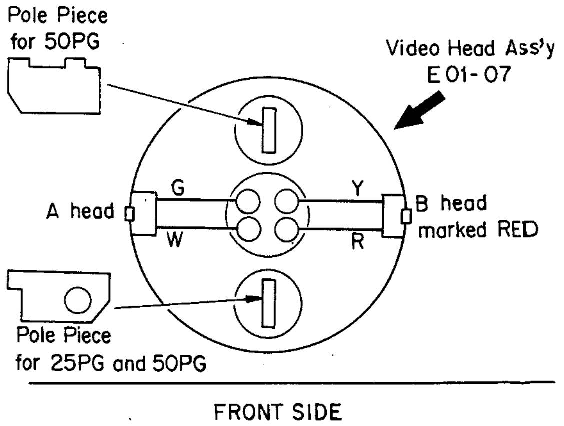
Pole Piece
for 50PG
Video Head Ass'y
E01-07
A head
G
Y
W
R
B head
marked RED
Pole Piece
for 25PG and 50PG
FRONT SIDE

Fig. 2. Video Head Ass'y Mounting Position

Correct

(2) Correction of SERVICE MANUAL Fig. 5-8 Measuring tape tension at the supply reel.

The path of the measuring string is changed.

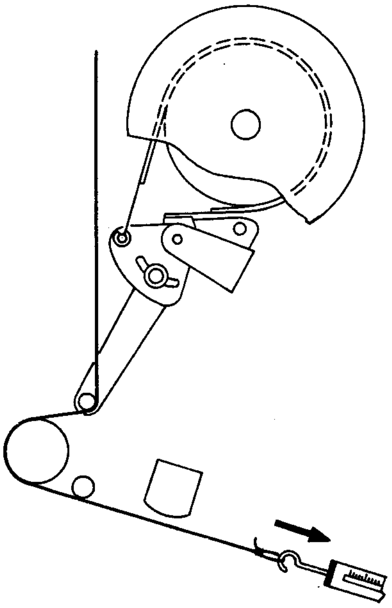

Fig. 3. Measuring tape tension at the Supply Reel

Wrong

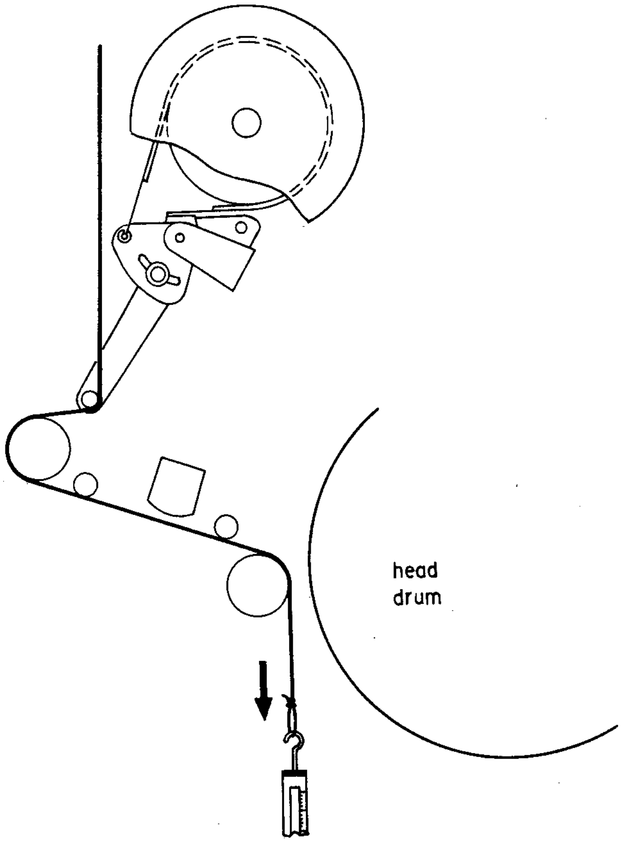

Fig. 4. Measuring tape tension at the Supply Reel

Correct

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3B0910-4

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SONY®
SERVICE MANUAL

CV-2100ACE

SUPPLEMENT

No. 5
February, 1972

SUBJECT: R (AGC) PRINTED CIRCUIT BOARD IMPROVEMENT

APPLICABLE
SERIAL NUMBER: 36401 and later

AGC Board is changed from R Board to R2 Board for circuit improvement.

ELECTRICAL PARTS

Part No.	*Description*	*Ref. No.*
	TRANSISTORS	
	2SC403C-5	Q201, 203 204, 205
	2SK23A-234	Q202
	DIODES	
	1T-40	D201 to D205
	CAPACITORS	
1-107-071-11	27 pF 50 WV ± 5 %, mica	C205
1-107-081-11	68 pF 50 WV ± 5 %, mica	C211
1-107-087-11	120 pF 50 WV ± 5 %, mica	C206

Part No.	*Description*	*Ref. No.*
1-108-539-11	0.033 μF 50 WV ± 20 %, mylar	C210
1-121-398-11	10 μF 25 WV elect	C203
1-121-409-11	47 μF 25 WV elect	C201, 202, 204, 207, 208, 209
1-121-410-11	16 μF 25 WV elect	C210
	INDUCTORS	
1-407-158-11	12 μH	1201
1-407-185-11	3.9 μH	1203
1-407-255-11	47 μH	1202
	RESISTORS	
	(Carbon resistor of ¼ W, ± 5 % are omitted.)	
1-222-804-11	1 kΩ adjustable	R222

ADJUSTMENT

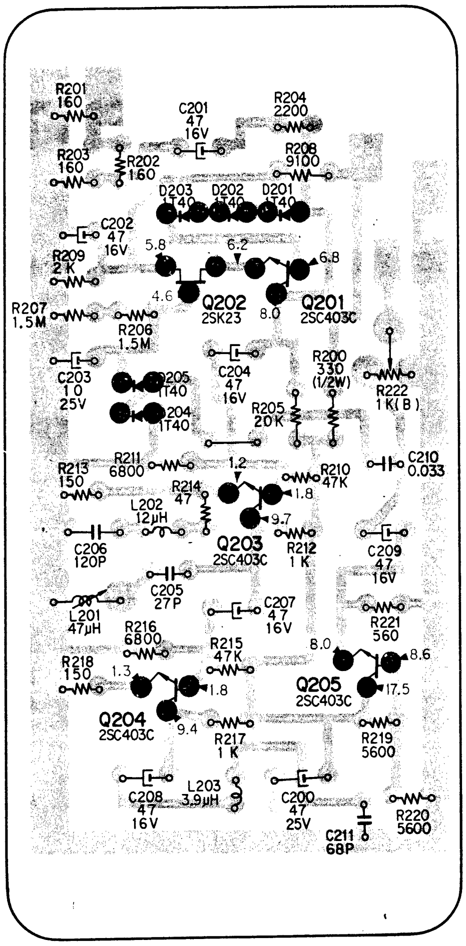
(1) Sub Carrier Trap

A series resonant trap consisting of L201 and C205 in the collector circuit of Q203 is tuned to eliminate the 4.43 MHz sub carrier signal.
Adjust for minimum 4.43 MHz subcarrier signal level.

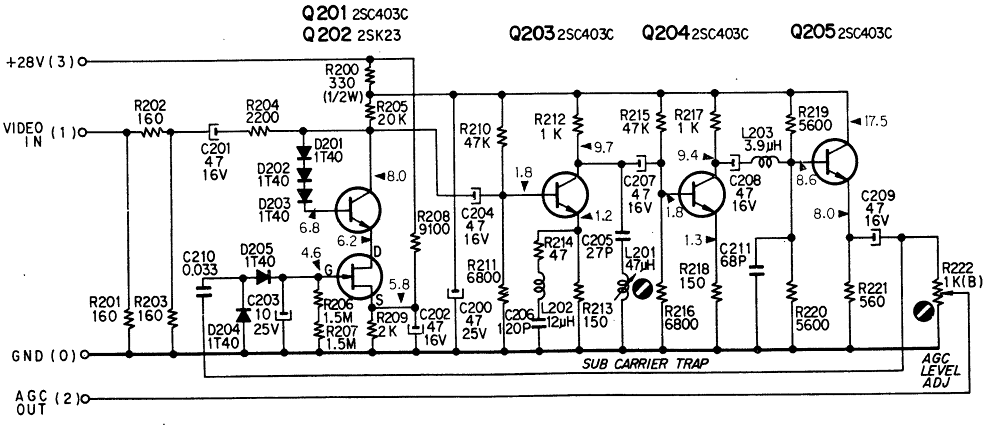
(2) AGC Output Level

Connect the scope to the center tap of R222 and adjust the R222 to obtain 0.3 V(p-p).

R2 PRINTED CIRCUIT BOARD – *Conductor Side* –


R201 160
R203 160
R202 160
C201 47 16V
R204 2200
R208 9100
D203 1T40
D202 1T40
D201 1T40
C202 47 16V
R209 2K
5.8
6.2
6.8
4.6
Q202 2SK23
8.0
Q201 2SC403C
R207 1.5M
R206 1.5M
C203 10 25V
D205 1T40
D204 1T40
C204 47 16V
R200 330 (1/2W)
R222 1K(B)
R205 20K
R211 6800
R213 150
1.2
R210 47K
1.8
C210 0.033
R214 47
L202 12μH
9.7
C206 120P
Q203 2SC403C
R212 1K
C209 47 16V
C205 27P
L201 47μH
C207 47 16V
R221 560
R216 6800
R215 47K
8.0
8.6
R218 150
1.3
1.8
Q205 2SC403C
17.5
Q204 2SC403C
9.4
R217 1K
R219 5600
C208 47 16V
L203 3.9μH
C200 47 25V
C211 68P
R220 5600

R2 BOARD SEHEMATIC DIAGRAM


Q201 2SC403C
Q202 2SK23
Q203 2SC403C
Q204 2SC403C
Q205 2SC403C
+28V (3)
VIDEO IN (1)
GND (0)
AGC OUT (2)
R200 330 (1/2W)
R205 20K
R202 160
R204 2200
C201 47 16V
D201 1T40
D202 1T40
D203 1T40
8.0
6.8
6.2
D
G
S
4.6
5.8
R208 9100
C204 47 16V
R210 47K
R212 1K
9.7
1.8
1.2
R215 47K
R217 1K
9.4
L203 3.9μH
R219 5600
17.5
8.6
8.0
C209 47 16V
C210 0.033
D205 1T40
C203 10 25V
D204 1T40
R201 160
R203 160
R206 1.5M
R207 1.5M
R209 2K
C202 47 16V
C200 47 25V
R211 6800
C206 120P
R214 47
L202 12μH
C205 27P
R213 150
C207 47 16V
L201 47μH
1.8
1.3
R218 150
R216 6800
C208 47 16V
C211 68P
R220 5600
R221 560
R222 1K(B)
SUB CARRIER TRAP
AGC LEVEL ADJ

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SERVICE MANUAL

CV-2100ACE

SUPPLEMENT

No. 6
January, 1972

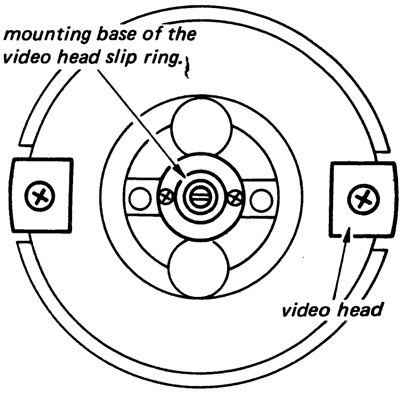
SUBJECT: New type of video head is being installed in CV-2100CE/ACE Series Videocorders at the serial number, #37190.

(i) The new head is fabricated of a monocrystalline ferrite material having same identification number, parts code number and nomination.

(ii) The new head can be identified by observing the mounting base of the video head slip ring. The mounting base of old type video head is made of aluminum material while that of new type video head is made of injection-moulded plastic material coloured-grey.

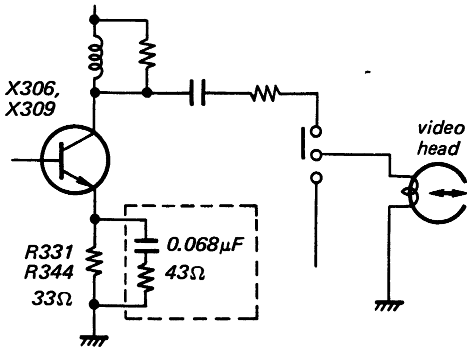
(iii) Head replacement in CV-2100ACE VTRs carrying serial number other than # 22501 through #24700. No special attention should be paid. Follow the head-installation procedures given in the SERVICE MANUAL.

(iv) Head replacement in CV-2100ACE VTRs having serial numbers #22501 through #24700. Circuit modifications given below must be made to match the new type heads to older machines.


mounting base of the video head slip ring.
video head

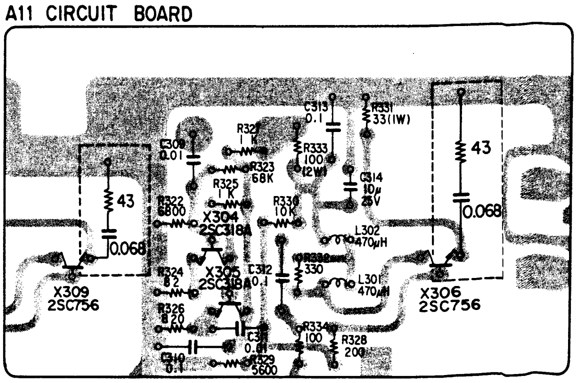
(v) Head replacement in CV-5600P/S VTRs. No special attention should be paid. Follow the head-installation procedures given in the SERVICE MANUAL.

Record amplifiers dual channels
Add a capacitor 0.068μF and 43Ω in parallel to R331 and R344 in the emitters of X306 and X309.


X306,
X309
R331
R344
33Ω
0.068μF
43Ω
video
head

Playback amplifier
Remove capacitors C344 and C343 120PF, in parallel to R344 and R353.

A11 CIRCUIT BOARD


C313
0.1
R331
33(1W)
R321
1 K
C309
0.01
R333
100
(2W)
R323
68K
C314
10μ
25V
R325
1 K
43
43
R322
6800
X304
2SC318A
R330
10K
0.068
0.068
L302
470μH
R332
330
R324
82
X305
2SC318A
C312
0.1
L301
470μH
X309
2SC756
X306
2SC756
R326
820
C311
0.01
R334
100
R328
200
C310
0.1
R329
5600

Capacitor
Resistor

Capacitor	0.068μF	1-108-249-12
Resistor	43Ω	1-244-640-11

3-790-560-11

3B0910-3

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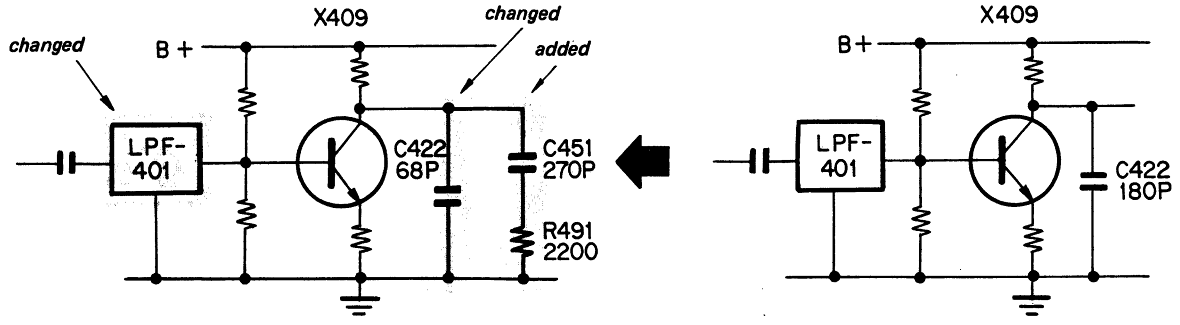
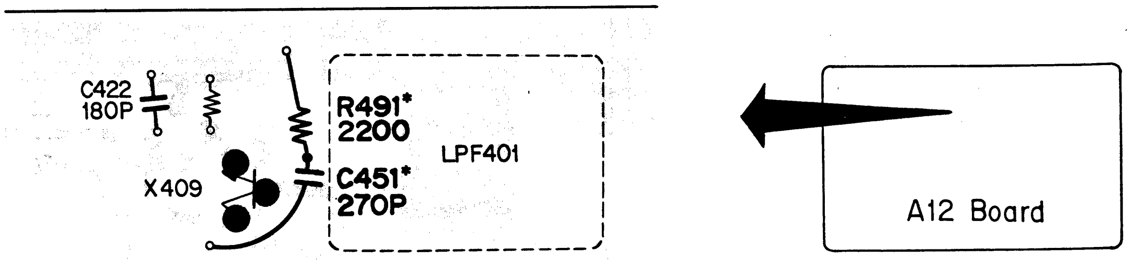
2-2. A12 Board Modification


changed
B +
X409
changed
added
LPF-401
C422 68P
C451 270P
R491 2200
X409
B+
LPF-401
C422 180P

(new circuit) *(former circuit)*

Fig. 4. Circuit modification (2)


C422 180P
X409
R491* 2200
C451* 270P
LPF401
A12 Board

* *C451 and R491 mounted on conductor side*

Fig. 5. A12 Board modification

New Parts Required:

Ref. No.	Remarks	New Parts		Former Parts
		Value	Part No.	
C422	changed	68 pF	1-107-081-11 (silvered mica)	180 pF
C451	added	270 pF	1-107-095-11 (silvered mica)	——
LPF401	changed	——	1-231-059-12	1-231-065-12
R491	added	2200 Ω	1-242-681-11 (carbon)	——

2-3. B5 Board Modification

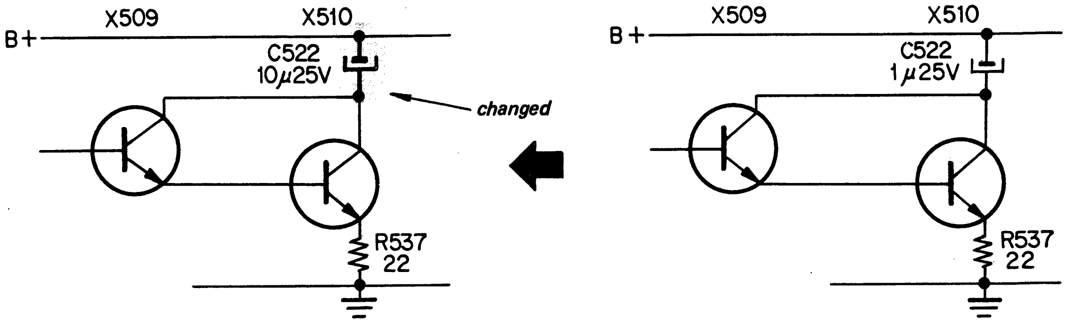


Fig. 6. Circuit modification (3)

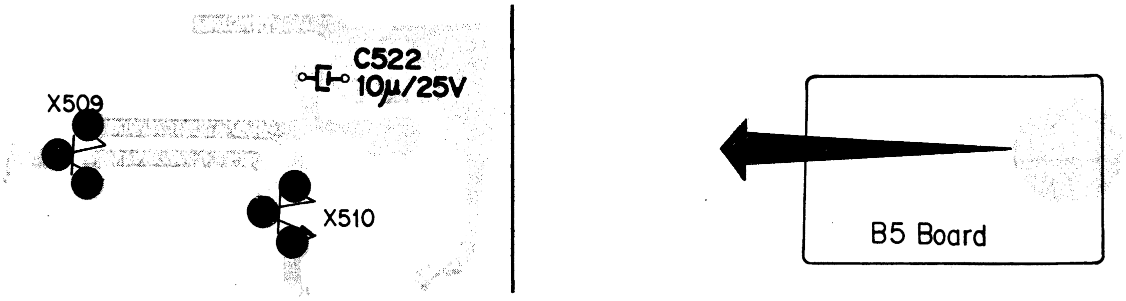


Fig. 7. B5 Board modification

New Parts Required:

Ref. No.	Remarks	New Parts		Former Parts
		Value	Part No.	
C522	changed	10 µF	1-121-348-11 (electrolytic)	1 µF

2-4. Adjustment

Carrier frequency adjustment has been changed as follows for the sets with serial number 10,601 and later.

sync tip carrier frequency : 2.6 MHz
white-peak carrier frequency : 4.6 MHz

Changes on the service manual
(for the sets with serial 10,601 and later)

a. Sec. 6-2: Carrier Frequency (page 6-2)

“Turn R301 (1 kohm) slowly from counter-clockwise position, a correct carrier frequency of *2.5 MHz** is indicated when there are 2.5 complete square waves in 10 divisions.”

* *Carrier frequency setting of 2.5 MHz produce a correct sync tip carrier frequency of 2.6 MHz with signal input.*

b. Sec. 6-2: Max. Deviation VIDEO LEVEL R702 (page 6-3)

“Set the RF Generator to *4.6 MHz.*”

“Advance VIDEO LEVEL (R702) and observe

the top step peak-white part of the signal. When peak deviation reaches *4.6 MHz,* a zero beat will be observed at the top step as shown in B of Fig. 6-2."

c. Sec. 6-2: White Clipping R305 (page 6-3)

(All descriptions should be changed as follows.)

1. Set up the E-to-E mode using a telecast signal, preferably a test pattern.
2. Connect the scope to TP-2.
3. Adjust R305 (White Clip) so that the extreme peak-white parts of the waveform are A+0.5 volts (p-p) as shown in Fig. 8.

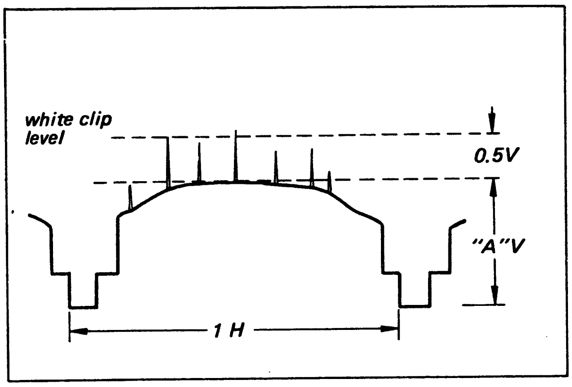


Fig. 8. Whit clip level

d. Sec. 6-5B: Factory Branch Adjustment (page 6-5)

" 8. Adjust R301 to obtain a carrier frequency of *2.5 MHz.*"

" 10. Reset R301 to produce the correct carrier frequency of *2.5 MHz.*"

" 12. Check symmetry at *2.5 MHz* and *4.6 MHz.* Reset carrier frequency to *2.5 MHz.*"

e. Sec. 1-2: SPECIFICATIONS (page 1-1)

"Horizontal resolution: Better than *270* lines (at 625 lines)"

3. INTERCHANGEABILITY

Tape-interchangeability between the sets with serial number up to 10,600 and from 10,601 are assured in our factory production.

Resolution Improvement for the CV-2100ACE's with serial number up to 10,600.

The CV-2100ACE's with serial number from 10,601 have been improved to have higher resolution compared with the CV-2100ACE's with serial number from 10,000 to 10,600. The modification of these 10,000 to 10,600 sets for improving the resolution will need factory service level test equipments. Therefore, in case of necessity to modify the old sets, make contact with an Authorized SONY distributor.